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"I would not have you take too much Phisick, for it doth all wales make me worse, and I think it will do the like with you."
Charles II.

Purgation, like emesis, fasting, bleeding, and other methods of depletion, has been used from the dawn of history in the effort to relieve physical illness and mental distress. Purgation calendars, indicating the times and constellations when these offices should be performed, were the first printed documents of medicine. Much of the purging carried out by medical men to-day is rooted in archaic and primitive beliefs rather than physiology and pathology. There are profound sources for these beliefs, with which a cursory study of Freudian psychology will acquaint you. Suffice it to say that the pleasure felt by the infant in the discharge of bodily functions, and the pain caused by the need to discipline them, play an important part in the mental development of mankind. Little children are told that they are good when they evacuate to order, and the idea that an action of the bowels is something meritorious and certain of reward lingers in many adult minds. You may phrase these beliefs anew and speak of increasing the excretions, flushing out toxins, or preventing auto-intoxication, but whenever you are tempted to purge a patient who has a fever or who is to face the ordeal of a surgical operation, I ask you to pause and consider whether you are not exchanging the laboratory jacket of the twentieth century for the panoply of the witch doctor and the exorciser.

As recently as 1918 Lane attributed to intestinal stasis loss of the feminine contours, low blood pressure, high blood pressure, asthma, neuritis, depression, melancholia, mastitis, cancer, tuberculosis, rheumatism, goitre, flat-feet, foul breath, offensive perspiration, and discoloration of the skin. All these maladies were to be prevented or relieved by the more frequent action of the bowel. Was there ever a more fantastic statement of the rewards of "being good"? Later, focal sepsis replaced constipation as the bogy, and organs such as teeth, tonsils, appendix, gall-bladder, uterus, and prostate were sacrificed on the altar of health. The excesses committed in the elimination of intestinal toxæmia and focal sepsis show that ideas derived from religion and magic are still at work in Western medicine, and that men are still ready to put their trust in purification and blood sacrifices in their time of trouble. My purpose in this lecture is to suggest that much of the purgation of sick people carried on to-day is harmful and only to be explained by thoughtless adherence to tradition. The evil effects of constipation have been exaggerated: few if any of the symptoms of acute illnesses can be attributed to constipation or relieved by emptying the bowel, and many of them are much aggravated by purgation.

Bowel Physiology

In certain people, especially patients, interest in the products of the large intestine can only be described as morbid and excessive. Students and many doctors, on the other hand, are too ready to accept at their face value the noughts and crosses which the nursing staff inscribe on the temperature charts, without realising that a cross may mean anything from a little damp flatus to the voluminous evacuation of sprue. If our attitude to the action of the bowels is to be rational, we must observe the number, size, and consistency of the stools, the state of the rectum, the method of administration and the volume of enemata, and the dosage and effect of purgative drugs, with the same care as every other detail of investigation and treatment, and not delegate these matters to the nursing staff. In health the bowels are opened once or twice a day according to diet and habit. This rhythm is easily disturbed in sickness, not always unavoidably. Too often patients in hospital are kept in bed because there is inadequate accommodation for them to be up, rather than because their disease requires it. Whenever possible the doctor should encourage them to get up for breakfast and the toilet, instead of inhibiting the delicately conditioned reflex of defæcation by a bed-pan. If a patient misses a daily action in his new surroundings, it is important to avoid a panic flight to purgatives, which will injure the normal rhythm much more than a single day's omission. Some patients undoubtedly are helped by a mild aperient, but one should stop the practice prevalent in many wards in which a Borgia-like sister makes an evening round and administers a powerful cathartic to any patient who is considered not to have done his duty. If a patient is too ill to get up to use the toilet, then he is possibly too ill to tolerate a purgative, and every such patient should be considered as an individual and not submitted to routine purgation.

A formed stool consists of unabsorbed food debris and the bodies of dead bacteria. The longer it is retained in the distal colon the more inert it becomes. Aperients, by hurrying undigested residues through the proximal colon and making them more watery, increase the number of viable bacteria in the stool. It is an old observation that relapses can be provoked in *Bacillus coli* pyelitis by giving an aperient. Apart from mechanical distension, a constipated stool exerts little more influence on the patient in the colon than in the bed-pan. The ill effects of constipation, as of masturbation, are almost entirely psychogenic and due to worry over disturbance of habit. Boys with megacolon and prolonged retention of fæces show little evidence of toxæmia. As I shall indicate later, I have deliberately kept ill people constipated for a week or longer without any symptoms from the bowel. Some inspissation of fæces may occur, especially in old people, with the formation of a rectal plug which requires assistance in dislodgement, but that is the only difficulty. The small intestine empties itself as completely as possible 14 hours after food and no purgative can make it any cleaner. The whole of the large intestine is accessible to lavage from the rectum. There is rarely any urgency for the bowels to be opened in acute illnesses, and when an action becomes desirable it should be secured by enemata and not by drugs.

Ill Effects of Purgation

Is there any harm in purgation? In patients who are acutely ill it may be a most dangerous expedient. Physiology has long emphasised the importance of a

* An address given to the Manchester Medical Students' Society on Jan. 29th, 1937.

constant internal environment for the organism, but it is only in recent years that medicine has realised the profound effect which increase in the secretions and excretions may have on that inner environment. A man may go without food for many days, but the deprivation of water or loss of the soluble salts of the organism is badly borne. The osmotic equilibrium between the cells and the body fluids is disturbed, the volume of blood is diminished, the circulation collapses, the renal function is impaired, the acid-base metabolism undergoes fluctuations which are beyond the bounds of compensation.

The output of water is normally concerned with the excretion of waste materials in solution by the kidney and in semi-solid form by the bowel, and the dissipation of body heat by vaporisation from the skin and lungs. Excretion of water by the kidneys and the bowel may be greatly curtailed in emergency, and this is the chief reason for the concentrated urine and the constipation of fever. Vaporisation by the skin must continue as long as life is to be maintained and, when the temperature is raised, several litres a day may be lost in this way. Coller (1936) has calculated that by the time a patient begins to show signs of dehydration, such as a dry hot skin, a dry tongue, sunken eyes, fever, and a low output of urine, there is a fluid deficit equal to about 6 per cent. of the body-weight or nearly four litres in the average adult. The obvious need in such a case is to increase the fluid intake, by parenteral channels if necessary, until the signs of dehydration disappear and the urine volumes return to normal. In acute illnesses constipation is usually a symptom of dehydration, and to purge a dehydrated patient, depleting the fluid reserves still further, is always foolish and often disastrous. Here are some examples from my own experience:—

In Addison's disease the water balance is very unstable, owing probably to the loss of the suprarenal control of the excretion of sodium salts by the kidney. Mrs. A, aged 43, had been under treatment for Addison's disease for nine months. As I wished to study her metabolism further, her Cortin was stopped for a few days on Nov. 23rd, though salt by mouth was continued. In order to obtain a good sample of fæces for analysis, the house physician gave her senna infusion on the evening of the 28th and again on the morning of the 29th. Five stools were passed on the 29th and her temperature rose abruptly. On the 30th it reached 106° F. and she was semi-conscious with rigid limbs. She was terribly ill for over a week, but we gave her saline infusions and cortin in doses of 100 c.cm. daily and she eventually recovered. I interpreted her illness as a crisis of suprarenal insufficiency with dehydration fever and muscle cramps provoked by a very moderate catharsis.

A man of 52 who had had symptoms of duodenal ulcer since 1929 developed pyloric stenosis at the beginning of 1936. He had suffered from copious and projectile vomiting for two months before admission to the medical unit, and had been performing gastric lavage for one month. His general condition appeared satisfactory, blood pressure 165/110, blood count normal, blood-urea 47 mg. per 100 c.cm., alkali reserve 62 vols. carbon dioxide per cent., plasma chlorides 577 mg. per 100 c.cm. While, however, his best weight was 10 st. 10 lb., his present weight was only 8 st. 2 lb. After further gastric lavage he was transferred to the surgical unit for gastro-enterostomy on the fifth day. The operation went very smoothly, but on the fourth day after the operation, following an aperient, his bowels were opened four times. On the fifth day his bowels were opened nine times and his general condition deteriorated rapidly. The blood volume was diminished, as shown by the fact that the red cell count had risen to 6·8 millions per c.mm. The blood-urea was 320 mg. per 100 c.cm. Next morning the patient rather suddenly collapsed and became dyspnœic, his extremities were blue and cold, his face shrunken, and his systolic blood pressure was below 60 mm. Hg. The blood-urea had risen to 440 mg. per 100 c.cm.; the plasma chlorides had fallen to 483 mg. and the alkali reserve to 28 volumes per cent. Efforts to restore the circulation were of no avail and the patient died a few hours later. Although this man's blood count and blood chemistry were normal, his loss of approximately 25 per cent. of his weight was associated with such a great diminution in the fluid and mineral reserves of the body that he was unable to cope with a moderate diarrhœa, and quickly succumbed to uræmia and acidosis.

A man of 43 with bronchiectasis of the left lower lobe developed a massive pneumonia with high fever, which necessitated treatment in the oxygen tent from the 3rd to the 14th day. His illness was punctuated by two attacks of diarrhœa, directly due to the giving of aperients: on the 5th day, when he had five stools, and on the 9th day, when he had seven stools. The difficulties of treating in an oxygen tent a delirious patient with diarrhœa can hardly be exaggerated.

Purgation in Acute Disease

When these things occur in wards whose chiefs hold strong views about the risk of aperients in acute illness, one wonders what disasters occur elsewhere. Quite frankly, such accidents are usually due to allowing the administration of aperients to fall into the hands of the nursing staff. I am well aware of the difficulties inherent in the relationship between an inexperienced house officer and an experienced ward sister. But the house man should remember that experience does not always teach. The nursing type of mind, being feminine, tends to be conservative; it holds fast to the orthodox and avoids experiment because of its dangers. On the other hand, nurses are good observers, prepared to be persuaded by results, and with a little tact difficulties of this kind can usually be surmounted. An aperient is a drug. A nurse may not administer a drug unless it has been ordered in writing. The doctor who permits errors by ordering aperients *p.r.n.* is himself directly responsible. It must be admitted that text-books of medicine rarely emphasise these dangers and in some ways have hardly advanced from the old purgation calendars.

In acute tonsillitis "an initial dose of calomel, 2 to 4 grains, should be administered and followed by a saline aperient" (Barwell 1933).

In cerebro-spinal fever "it is frequently necessary to use purgatives. . . . If the patient is comatose early in the disease, when treatment is beginning, it may be advisable to give 2 minims of croton oil" (Horder 1933).

In pneumonia "it is important to get good action of the bowels in the early stage of the disease. The large bowel should be completely emptied. Later on, the less the patient is disturbed in any way the better" (Chandler 1936).

I am glad to be numbered amongst those who have never administered croton oil. The sense of these statements appears to be that one should only purge at the onset of a febrile illness, before the patient becomes dehydrated. The following method of eliminating an imaginary toxin in eclampsia needs a good deal of stomaching:—

"If we knew what the toxin was we might be able to administer an antidote, but at present the best we can do is to hasten its elimination from the system through the ordinary channels of excretion, viz., the bowels, the kidneys, and the skin. The lower bowel should be cleared out as quickly as possible by large enemata, and the irritating contents of the stomach should be washed out by the stomach tube. . . . Sulphate of magnesia, jalap, or calomel in large doses should be given through the stomach tube when the washing out is finished, or by mouth when the patient is conscious. . . . Large doses are necessary, as absorption seems to be in abeyance,

and what would actively purge the patient under ordinary conditions would hardly move her bowels in an eclamptic seizure" (Jardine 1921).

In diabetic coma "clear the bowels with an enema but do not waste time on this in collapsed cases. Constipation is usually extreme and a potent cause of toxæmia" (Lawrence 1933).

The loaded bowel of diabetic coma has impressed many observers, but surely it is putting the cart before the horse to regard the constipation as a *cause* of toxæmia. It seems much more probable that the constipation is the *result* of toxæmia and deviation of water to the kidney. Acidosis and alkalosis both cause dehydration. It is interesting in this regard to note that alkalosis also is accompanied by constipation, and that treatment of the constipation may make the alkalosis worse:—

"In all cases the onset of symptoms was preceded by several days' obstinate constipation. Apart from any direct relationship there may be between constipation and the onset of alkalosis, it is possible that there may be an important indirect connexion between the two. The proportion of magnesium oxide or carbonate is often increased in cases of peptic ulcer as a convenient means of correcting constipation without incurring the disadvantages of more drastic purges—a practice which, owing to the high alkalinity of these magnesium salts, may well determine the onset of alkalosis" (Oakley 1935)

In the treatment of uræmia, purgation is no longer recommended. Osman (1936) writes: "The fluid balance in the body, and particularly the volume of urine excreted, should never be upset by the giving of purges" and Sir W. Langdon-Brown tells me that in the next edition of Price's "Medicine" the use of purges in uræmia will no longer be recommended.

Pre-operative Purgation

Surgical operations provide one of the best examples of an acute illness or emergency, for which careful plans can be laid. Surgeons have such a surfeit of physiology in the primary fellowship examination that they may be forgiven a revulsion from it afterwards. Nevertheless, physicans have much to learn from surgeons about the practical application of physiological principles in the prevention and treatment of dehydration. My researches into the customs of my surgical colleagues have revealed a curious mixture of the medieval and the modern in the attention paid to the bowels in patients undergoing operative treatment:—

It is necessary to take an ounce of castor oil the night before tonsillectomy or similar operation on the nose and throat.

Patients with Graves's disease are no longer purged before thyroidectomy as they sometimes died of diarrhœa when this was done.

In other operations outside the abdomen aperients such as castor oil, or senna and salts, are given on the two nights before operation, and again 48 hours after operation and on each succeeding night.

If the operation is inside the abdomen, but the stomach or bowel is not cut, the same ritual is followed, with the addition of an enema 12–36 hours after operation.

If the operation is on the stomach or duodenum, there is no pre-operative drugging, but an enema of 1 quart of plain water is given at least two hours before operation. A simple enema is given 24–36 hours after operation and then daily for the first five days at any rate. Sometimes liquid paraffin, 2 drachms b.d., is given by mouth from the third day.

I learn that in gastric surgery "the giving of cathartics is contra-indicated because the effect of them is to dehydrate the patient, irritate the colon and cause post-operative gaseous distension" (Eusterman and Balfour 1935). I should have thought that what was bad for a duodenal ulcer was bad for a femoral hernia, but it appears that the surgeon, like the physician, still purges any unfortunate patient who is robust enough to stand the strain. Only when experience has shown that purgation may be lethal is the bitter cup withheld. Can we wonder that disturbances of bowel habit so often date from a surgical operation? I take the following purgation calendar from the current practice of rectal surgery:—

If for operation on Monday:—

Haustus sennæ co. 1½ oz.	Thursday 6 P.M.
Haustus sennæ co. 1½ oz.	Friday 6 p.m.
Ol. ric. 1½ oz.	Saturday 6 P.M.

Enema saponis Sunday morning and evening.

Enema saponis Sunday midnight S.O.S., and one or two as necessary Monday morning.

Patient is kept on fluids, jelly, and custard all Sunday. Haustus catechu co., 1 oz., to be given 6 A.M. and 10 A.M. Monday morning.

Fluid diet after operation until bowels open.

Liquid paraffin b.d., to start on 4th day (morning).

Fourth day evening at 6 P.M. olive oil enema, 10 oz., run in slowly.

12 midnight ol. ric. 1½ oz.

Patient to be kept on paraffin with or without phenolphthalein afterwards.

One can hardly imagine a method better calculated to secure a wet and messy large bowel than the early days of this régime. Surely the obvious way to keep the large bowel clean is to give the patient a low residue diet and wash out the colon from below. It reminds me of the following recipe for expelling tapeworms. The expulsion of worms, like the hunting of the badger, has become a rare sport in Great Britain, but it might nevertheless be conducted on more humane lines.

Fluid diet for three days; initial dose of castor oil and daily dose of magnesium sulphate for three mornings. On the fourth morning give extract. filicis liq. . . . Two hours later give magnesium sulphate, ½ oz. in water (Livingstone 1935).

Hæmatemesis and Melæna

During the last two years I have been specially interested in the treatment of hæmorrhage from the stomach and duodenum. I need hardly remind you that those patients are often severely dehydrated and in bad cases the blood-urea is raised. The orthodox treatment is to forbid food and drink by mouth for 48 to 72 hours and to give fluid by the rectum. On this account it is customary to wash out the large bowel early in the illness. My own treatment is unorthodox, inasmuch as I feed the patient by mouth from the onset, giving approximately 2500 c.cm. of fluid diet every 24 hours. I do not give fluid by rectum, as I was greatly impressed by Cullinan and Price's (1932) observations on the effects of enemata in alimentary hæmorrhage:—

"The fetish of giving large numbers of enemata is dangerous and to be deprecated. This applies especially to the giving of enemata in the early days of treatment, when recurrence is most likely to occur. Hæmorrhage appeared to follow closely, in many of these cases, the giving of the first enema. In 73 cases enemata were given before the sixth day, and 7 of these were rapidly followed by further hæmorrhage. In each of these cases the hæmorrhage would appear to have ceased before the giving of the first enema and the recurrence to have been excited by it. In certain of the cases where this therapy was started early, hæmorrhage followed subsequent enemata. Thus in another 7 cases, recurrent bleeding took place at a date when the danger of recurrence

is usually past, and was shortly preceded by the giving of an enema. We believe that these recurrences also may well have been excited by the enemata. Only 17 cases received their first enema on or after the sixth day, all without harmful consequences."

Apart from the initial melæna, which does not occur in all cases, the bowels are not opened naturally for some days after a gastroduodenal hæmorrhage. The constipation is not entirely attributable to morphia, as we have observed it in patients who have not received morphia. Moreover, the bowel is very refractory to aperients for one or two weeks after a hæmorrhage, and quite a strong aperient, such as ½ oz. of magnesium sulphate in 1 oz. of infusion of senna twice daily, may fail to act for several days. I have avoided aperients, and have not begun the use of enemata until between the fifth and the tenth day. Liquid paraffin has usually been started by mouth about the end of the first week, but it has been as long as the eighteenth day before the bowels have acted naturally. My results, which I hope to publish soon, have been very satisfactory. There has been no discomfort or pain attributable to the constipation. The tongue has remained clean or white from the milky diet, there has been no fœtor oris, no fever, no distension. The appetite has usually been good, and when nausea and vomiting occurred, they appeared to be the result of hæmorrhage and anæmia and improved after transfusion.

Conclusions

The time has now come for me to state some of my conclusions in this matter. Routine purgation in acute illnesses or before operations is unnecessary and often harmful. In most acute diseases there is a tendency to dehydration. Constipation is a result of acute disease and not a cause. With few exceptions toxins are neither absorbed nor excreted through the bowel wall. Intestinal toxæmia is more likely to result from diarrhœa than from constipation. Purgation disturbs and exhausts the patient; provokes gastro-enteritis, especially in acute infections; increases dehydration and leads to uræmia in toxic states; excites vomiting, hæmorrhage, and distension in lesions of the alimentary tract. Purgatives may be given in acute bacterial infections of the alimentary tract to secure elimination; and in increased intracranial pressure and status epilepticus for deliberate dehydration. With these exceptions purgatives should not be administered to patients who are acutely ill.

There is rarely any hurry to get a patient's bowels open for four or five days. Lubricants such as liquid paraffin can then be given to soften the fæces and enemata every 48 hours. Constipation does not cause meteorism. The most common cause of meteorism is handling or infection of the bowel in surgical patients. It is described, but seldom seen, as a result of severe toxæmias such as pneumonia. Perhaps the most important medical cause is typhoid fever, in which there is ulceration of the bowel and diarrhœa. The gas, of which part is swallowed air and part is formed by decomposition of the intestinal contents, is distributed throughout the stomach and the intestine. Surgeons have learnt to avoid meteorism in predisposed cases by banning anything by mouth and giving fluid parenterally. In certain cases of peritonitis these measures are combined with continuous aspiration of the stomach and duodenum and repeated injections of morphia, and the bowels are kept at rest for ten days while the peritonitis resolves.

Purgatives should never be given in diseases of which diarrhœa is a symptom, such as Addison's disease and thyrotoxicosis. They are also very dangerous in measles, severe burns, and œdema. With these exceptions one may sometimes temper science with art, for some patients become restive when the bowels are not opened naturally, even though enemata give satisfactory results, and an aperient may then do less harm than the mental perturbation. It is an ancient observation that purgatives sometimes stop vomiting, and when peristalsis is upset, as in "biliousness" and similar conditions of reversed peristalsis, calomel may restore the normal gradient. I should regard such a procedure as being on a par with the use of digitalis or quinidine in heart disease, a toxic drug being used to restore a disturbed neuromuscular rhythm. Even though digitalis is kept in a poison cupboard while purgatives are accessible to everyone, I hope that you will never forget that purgatives are powerful and dangerous drugs. One of the most important lessons we have learnt in recent years is the ease with which sick people may be killed by household remedies such as sodium bicarbonate and Epsom salts. Hurst (1936) has suggested that more people have died from alkalis than from barbiturates, and I firmly believe that more people have died from purgatives than from digitalis.

Summary

The purgation of patients who are acutely ill or who are to undergo an operation is often a magic ritual rather than a rational treatment. Constipation is a symptom of acute illness and not a cause. Patients who are acutely ill are dehydrated and dehydration is aggravated by purgation. There is rarely any urgency for the bowels to act in acute illness, and when it is necessary they should be opened by enemata and not by drugs. In alimentary hæmorrhage and in peritonitis there is often great benefit from keeping the bowels inactive for 5 to 10 days.

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VICTORIA HOSPITAL FOR CHILDREN, CHELSEA.—At a dinner held at Grosvenor House on Feb. 11th to celebrate the 70th anniversary of this hospital, over which the Duke of Gloucester presided, between £3000 and £4000 was subscribed towards the reduction of its debt of £10,000.

ROYAL INFIRMARY, MANCHESTER.—During the past five years a deficit of £79,817 has been accumulated by this hospital, and last year's deficit was nearly double that of 1935. The number of in-patients admitted in 1936 was 10,902, plus 1581 to Barnes convalescent home; new out-patients numbered 20,831, and 173,339 attendances were recorded.

HÆMORRHAGIC DISEASE OF THE NEW-BORN

A STUDY OF SIXTY-ONE CASES

By Norman B. Capon, M.D. Liverp., F.R.C.P. Lond.

LECTURER IN DISEASES OF CHILDREN IN THE UNIVERSITY OF LIVERPOOL; HON. CONSULTING PÆDIATRIC PHYSICIAN, LIVERPOOL MATERNITY HOSPITAL; HON. ASSISTANT PHYSICIAN, ROYAL LIVERPOOL CHILDREN'S HOSPITAL

HÆMORRHAGIC disease of the new-born is important even though it is comparatively rare; for it affects infants who are apparently healthy, it endangers life with dramatic suddenness, and it often requires special treatment at the earliest possible moment. When death is prevented and adequate steps are taken to cure the secondary anæmia as quickly as possible, the infant shows no further tendency to bleed and enjoys normal prospects of health; this fact should encourage all those concerned with new-born babies to employ effective treatment immediately the disorder shows itself.

I have published two previous papers (1924, 1932) on this subject, based on 28 cases; since then I have had a further 33 cases under my care and I propose to summarise the experience gained in the observation and treatment of these 61 patients, 48 of whom were seen in the Liverpool Maternity Hospital, 6 in the Royal Liverpool Children's Hospital, and 7 in private practice. In the 61 cases, there were 5 deaths and 56 recoveries.

NOMENCLATURE AND DIAGNOSIS

The name "hæmorrhagic disease of the new-born" is not entirely satisfactory, but while the cause of the condition remains unknown a better title cannot be given; at least it is descriptive, but it must be used strictly and not applied to examples of neonatal hæmorrhage which are clearly secondary—e.g., slipping of umbilical ligature, trauma, sepsis, syphilis, or genital crisis of the new-born. Admittedly it may be impossible to exclude in any individual case the possibility of some of the above causes, and a perusal of my case records (Table III) may invite criticism regarding the inclusion of a few of the cases; but I have excluded from this study all examples of neonatal hæmorrhage which had an obvious primary cause.

The syndrome is quite clear-cut and there is seldom any difficulty in diagnosis. Slight confusion is sometimes caused by (1) the infant who, having swallowed maternal blood during birth or from the breast, returns the blood by vomiting, or passes it rectally; and (2) the infant who develops an acute enterocolitis with blood in the motions. The first shows no general effects of hæmorrhage while the second suffers from diarrhœa and the motions contain fairly large amounts of mucus tinged red.

SOURCE OF BLEEDING

In most cases the chief bleeding is from the alimentary tract, as will be seen from Table I:—

Table I—*Source of Bleeding*

Melæna alone	34
Melæna with hæmatemesis	21
Melæna with hæmatemesis and epistaxis and submucous (palate) bleeding	1
Umbilical hæmorrhage	1
Umbilical and submucous (palate) bleeding	1
Vaginal hæmorrhage	1
Bleeding from umbilicus, urethra, and nose; and submucous, in mouth	1
Bleeding from umbilicus and vagina; under mucous membrane of mouth and vulva; and subcutaneous	1
	61

ÆTIOLOGY AND INCIDENCE

A typical case, with sudden and severe melæna, closely resembles hæmorrhage from a peptic ulcer in adult life. Many observers (e.g., Theile 1919, Bayer 1929) have described ulcers found post mortem in these cases, and I myself have seen several autopsies at which ulcerative erosions of gastric or duodenal vessels have been clearly demonstrated. No satisfactory explanation of these ulcers and erosions has yet been offered; it is, of course, possible that they are secondary to hæmorrhage in the submucous layer of the alimentary tract, and in that case the ulcers must be regarded as "secondary" rather than "primary." It seems clear that there must be a "general" cause acting in those cases showing several sites of bleeding at the same time; and even if the view is accepted that most cases of melæna are to be ascribed to hæmorrhage taking place from the base of a "primary" ulcer, it is remarkable that, when the patient survives, the ulcer always heals rapidly.

Much work remains to be done upon the morphology and biochemistry of the blood in these cases; the reports to date are conflicting, and further investigation will probably show that the disease may be subdivided into several types.

Frequency.—I can calculate the frequency only on the 48 cases seen in the Liverpool Maternity Hospital. During the period under review (January, 1923, to September, 1936) there were 19,421 live births in that institution; hence the frequency of the condition was 1 in 405.

Sex.—Of the 61 infants 36 were females and 25 males.

THE MOTHER AND THE CHILD

Maternal and obstetrical influence.—The parity of the mother is shown in Table II:—

Table II—*Parity of Mother*

Primigravida	30
Second pregnancy	14
Third pregnancy	8
Fourth pregnancy	1
Later than fourth pregnancy	7
Not recorded	1
	61

It is not possible to draw any conclusions regarding the influence which place-in-family may have upon the occurrence of the disease. I do not think that the age of the mother or the type of labour have any bearing on the condition. In many cases the pregnancy and labour were quite normal, but there were also examples of maternal toxæmia, breech delivery, forceps delivery, induction, and Cæsarean section.

Condition of infant.—The babies were usually full-term and of average weight. The birth-weights were as follows:—

1. Under 5½ lb.	5 cases	Average weight 5 lb. 1½ oz. Smallest weight 4 lb. 7 oz.
2. 5½ lb. to 9 lb.	45 „	Average weight 7 lb. 1½ oz.
3. Over 9 lb.	4 „	Average weight 9 lb. 4 oz. Heaviest weight 9 lb. 8 oz.
4. Unstated	7 „	

Age at onset of hæmorrhage.—For 59 cases, the average age of the child when bleeding began was 41½ hours. In 2 cases it had a late onset, one at 120 hours and another at 288 hours after birth.

PROGNOSIS

Prognosis is very difficult, because it must depend in part upon the (unknown) cause of the condition. But at present it appears that prognosis, at all

TABLE III—SUMMARY OF CASES

Case No.	Sex.	Pregnancy.	Weight.	Pregnancy and labour.	Age in hours when bleeding began.	Type of hæmorrhage.	Special treatment (Footnote (a)).	Result (Footnote (b))	Additional notes.
1	F.	2nd	lb. oz. 7 14	Normal vertex after induction.	26½	Melæna.	Horse serum 10 c.cm. Mat. B. 10 c.cm.	R.	Subsequently developed obesity.
2	F.	2nd	4 7	Toxæmia of pregnancy. Vertex.	120	Umbilical.	Mat. B. 2 c.cm. I.V. (S.L.S.). Mat. B. 18 c.cm.	R.	Local treatment (tannic acid: adrenaline) also used.
3	M.	4th	7 14	Normal vertex after induction.	43	Melæna. Hæmatemesis.	Horse serum 10 c.cm.	R.	Calcium lactate 3 grains 4-hourly by mouth for 3 days; and horse serum ½ drachm by mouth. Mother developed puerp. insanity.
4	F.	1st	6 5	Normal vertex.	24	Melæna. Hæmatemesis.	Horse serum 10 c.cm. Mat. B. 30 c.cm.	R.	..
5	F.	6th	5 4	Chronic renal disease. Twins—both breech.	49½	Melæna. Hæmatemesis.	Horse serum 4 c.cm. Pat. B. 46 c.cm. Mat. B. 8·5 c.cm. Mat. B. 1·5 c.cm. I.V. (S.L.S.).	R.	..
6	F.	6th	5 2		43½	Melæna. Hæmatemesis.	Horse serum 5 c.cm. Pat. B. 30 c.cm.	D.	..
7	F.	6th	8 1	Normal vertex.	78½	Melæna. Hæmatemesis.	Fibrogen (Merrell) ½ c.cm. subcut. Mat. B. 26 c.cm.	D.	..
8	F.	13th	5 8	Normal.	16	Melæna. Hæmatemesis.	Pat. B. 20 c.cm.	R.	Now 11 years of age and perfectly healthy.
9	M.	1st	8 15	Normal vertex.	38	Melæna. Hæmatemesis.	Fibrogen (Merrell) 15 min. subcut. Pat. B. 23 c.cm.	R.	Mother had three eclamptic fits after delivery.
10	M.	?	?	?	48	Melæna. Hæmatemesis.	Pat. B. 20 c.cm.	R.	Infant born at home and admitted to hospital for treatment.
11	F.	1st	? "premature."	"Short labour."	84	Melæna.	Pat. B. 10 c.cm.	R.	Treated in own home.
12	F.	1st	6 10	Normal vertex.	1	Melæna.	Mat. B. 20 c.cm. Mat. B. 6 c.cm. I.V. (S.L.S.).	R.	..
13	M.	1st	6 5	Normal vertex.	31½	Melæna.	B. 70 c.cm.	R.	..
14	F.	2nd	6 10	Normal vertex.	17½	Melæna.	B. 30 c.cm.	R.	..
15	M.	1st	8 3	Normal vertex.	5½	Melæna.	Mat. B. 20 c.cm.	R.	..
16	M.	1st	9 2	Normal vertex.	41½	Melæna.	Mat. B. 18 c.cm.	R.	..
17	F.	2nd	6 12	Vertex R.O.P. to R.O.A.	36	Melæna.	Mat. B. 15 c.cm.	R.	..
18	M.	2nd	5 5	Vertex. First of twins.	38½	Melæna. Hæmatemesis.	Mat. B. 45 c.cm.	R.	The other twin (female, 5 lb. 7 oz.) did not bleed.
19	F.	1st	6 4	Vertex R.O.P.	44	Melæna.	Hæmostatic serum 2 c.cm. Pat. B. 45 c.cm.	R.	..
20	M.	1st	6 15	Cæsarean section.	20½	Melæna. Hæmatemesis.	Pat. and Mat. B. 85 c.cm.	R.	Very severe case with waxy pallor. Appeared normal at age of 2 years 10 months.
21	F.	3rd	7 4	?	25	Melæna. Hæmatemesis.	Horse serum 10 c.cm. Mat. B. 20 c.cm.	R.	Born at home and admitted to hospital. Pyrexia (max. temp. 104°) followed bleeding and lasted 2½ days.
22	F.	5th	9 1	Normal vertex.	55	Vaginal.	Mat. B. 30 c.cm.	R.	Severe bleeding, considerably more profuse than in genital crisis; began on 2nd day of (? dehydration) fever (Footnote (c)).
23	M.	3rd	5 12	Normal vertex.	48	Melæna.	Mat. B. 10 c.cm.	R.	Premature infant with cord tightly round neck: white asphyxia. Progressed well: on discharge 6 lb. 5 oz.
24	M.	3rd	? "average."	Easy forceps.	288	Umbilical. Submucous (palate).	Mat. B. 30 c.cm.	D.	Infant born at home and treated there. The cord had separated normally.
25	M.	1st	8 0	Normal vertex.	30½	Epistaxis. Melæna. Hæmatemesis. Submucous (palate).	Pat. B. 20 c.cm.	R.	Infant born at home and treated there.
26	F.	1st	?10 0	Vertex. Low forceps.	32	Melæna. Hæmatemesis.	Mat. B. 20 c.cm.	R.	Infant born at home and treated there.
27	M.	2nd	9 8	Normal vertex.	48	Umbilical. Epistaxis. Urethral. Submucous (palatal).	Pat. B. 14 c.cm.	R.	Infant born at home and treated there. Slight case.
28	F.	3rd	7 0	Normal vertex.	27	Melæna.	Mat. B. 30 c.cm.	R.	..
29	F.	3rd	?	Normal vertex.	4½	Melæna. Hæmatemesis.	Hæmoplastin 1 c.cm. B. 18 c.cm.	R.	Infant born at home: admitted to hospital.
30	F.	2nd	7 1	Normal vertex.	78½	Melæna. Hæmatemesis.	Mat. B. 20 c.cm.	R.	A moderate hæmorrhage.
31	F.	1st	5 12	L.O.P. to L.O.A. Forceps delivery.	60	Melæna.	Mat. B. 40 c.cm.	R.	Moderately severe bleeding.
32	F.	1st	6 9	Normal vertex.	80½	Melæna.	Mat. B. 9 c.cm. Pat. B. 20 c.cm.	R.	Moderately severe bleeding.
33	M.	1st	9 0	Normal vertex.	19½	Melæna.	B. 50 c.cm.	R.	Fairly severe bleeding.
34	M.	1st	6 10	Normal vertex.	41½	Melæna. Hæmatemesis.	Mat. B. 20 c.cm. Pat. B. 60 c.cm.	R.	A severe case; bleeding continued 26 hours. At 5 months progressing fairly well but still pale.

(a) Injections given intramuscularly unless otherwise stated. Mat. B. and Pat. B. = Maternal and Paternal blood. B. = Donor's blood. I.V. = Intravenously. S.L.S. = Superior longitudinal sinus. Subcut. = Subcutaneously.
(b) R. = Recovered. D. = Died.
(c) (Case 22) A septic cause cannot be excluded with certainty because the child subsequently developed sepsis of the face and scalp; pus aspirated (*Staphylococcus aureus*).

TABLE III—SUMMARY OF CASES—(*continued*)

Case No.	Sex.	Pregnancy.	Weight.	Pregnancy and labour.	Age in hours when bleeding began.	Type of hæmorrhage.	Special treatment (Footnote (*a*)).	Result (Footnote(*b*)).	Additional notes.
			lb. oz.						
35	F.	1st	6 9	Quinine induction. Normal vertex.	59½	Melæna.	B. 114 c.cm. B. 80 c.cm. I.V. (S.L.S.).	R.	A severe case, but at 2 months colour good and progress excellent.
36	F.	1st	7 1	Normal vertex.	36	Melæna.	Mat. and Pat. B. 100 c.cm.	D.	..
37	F.	1st	6 7	Vertex. Low forceps. (Face to pubes.)	51	Melæna.	Pat. B. 55 c.cm.	R.	Small subconjunctival hæmorrhage attributed to birth-trauma. Severe melæna: blood hæmoglobin 60 %.
38	F.	1st	7 6	Normal vertex.	42	Melæna. Hæmatemesis.	Mat. B. 20 c.cm. Pat. B. 70 c.cm.	R.	..
39	F.	1st	7 2	Normal vertex.	26½	Melæna.	Pat. B. 14 c.cm.	R.	..
40	M.	2nd	6 3	Normal vertex.	76	Melæna. Hæmatemesis.	Pat. B. 45 c.cm.	R.	..
41	F.	1st	6 10	Normal vertex.	36	Melæna.	Mat. B. 5 c.cm. Pat. B. 40 c.cm.	R.	Mother had pyelitis just after delivery and severe epistaxis about the time infant began to bleed.
42	M.	1st	7 13	Quinine induction. Normal vertex.	34½	Melæna.	Mat. B. 30 c.cm.	R.	..
43	F.	2nd	7 6	Cæsarean section.	63	Melæna.	None.	R.	Slight to moderate hæmorrhage, in one stool only.
44	F.	1st	8 10	Slight toxæmia of pregnancy. Normal vertex.	39	Melæna.	Mat. B. 20 c.cm.	R.	Moderate hæmorrhage.
45	F.	7th	7 8	Normal vertex.	92	Umbilical. Vaginal. Subcutaneous submucous (vulva and tongue).	Pat. B. 6 c.cm. B. 20 c.cm. Pat. B. 30 c.cm. (I.V. foot vein).	R.	Subcutaneous hæmorrhages (petechiæ and ecchymoses) very extensive (Footnote (*d*)).
46	F.	2nd	6 11	Cæsarean section for fœtal distress.	69	Melæna.	Mat. B. 15 c.cm.	R.	Infant was in occipito-posterior position.
47	F.	2nd	7 14	Normal vertex.	26	Melæna.	Pat. B. 50 c.cm.	R.	Father's blood W.R. negative (Footnote (*c*)).
48	F.	2nd	5 9	Toxæmia of pregnancy. 2nd of twins. Breech after internal version.	39½	Melæna.	B. 15 c.cm.	R.	Other twin (male, 5 lb. 8 oz.), with congenital craniotabes, did not bleed.
49	F.	1st	7 12	Normal vertex.	38½	Melæna. Hæmatemesis.	B. 47 c.cm. Pat. B. 50 c.cm. I.V. (jugular vein).	R.	Severe case. Did not respond to intramusc. inject. of blood, but seemed to react at once to transfusion (36 hours after onset).
50	F.	1st	? "average weight."	Normal vertex.	48	Melæna.	Pat. B. 30 c.cm. B. 100 + 60 c.cm. I.V. (S.L.S.).	R.	Infant born at home and admitted to hospital for treatment (Footnote (*f*)).
51	M.	1st	? "average weight."	Normal vertex.	48	Melæna.	Mat. B. 56 c.cm. Pat. B. 10 c.cm.	D.	Infant born at home: received 56 c.cm. blood intramusc. and subcut. before admission to hospital (Footnote (*g*)).
52	M.	3rd	8 5	Breech.	56	Melæna.	None.	R.	..
53	F.	1st	6 3	Cæsarean section for placenta prævia.	56	Melæna.	Mat. B. 30 c.cm. Pat. B. 20 c.cm.	R.	After bleeding ceased child received 70 c.cm. paternal blood intravenously (S.L.S.) for relief of anæmia.
54	M.	3rd	6 12	Normal vertex.	64	Melæna.	Pat. B. 12 c.cm. Mat. B. 20 c.cm.	R.	Small supernumerary right auricle, but no other deformity found.
55	M.	9th	7 2	Ante-partum hæmorrhage. Normal vertex.	10	Melæna.	Mat. B. 20 c.cm.	R.	Baby feeble at birth; cried 15 min. after delivery.
56	M.	1st	7 0	Normal vertex.	39½	Melæna. Hæmatemesis.	Mat. B. 44 c.cm. Pat. B. 75 c.cm. I.V.	R.	Restlessness and crying until transfusion. Severe bilateral talipes equino-varus.
57	M.	1st	9 4	Vertex. Low forceps.	35½	Melæna. Hæmatemesis.	Hæmoplastin. Pat. B. 40 c.cm. Pat. B. 100 c.cm. I.V. (median basilic).	R.	Slight right facial paralysis (due to forceps) (Footnote (*h*)).
58	M.	3rd	8 12	Normal vertex.	42½	Melæna. Hæmatemesis.	Pat. B. 36 c.cm. Pat. B. 80 c.cm. I.V. (S.L.S.).	R.	No improvement until transfusion but thenceforward uninterrupted.
59	F.	2nd	5 6	High lateral placenta prævia. Vertex. Willett's forceps.	35½	Melæna.	B. 20 c.cm.	R.	..
60	M.	1st	7 5	Normal vertex.	4	Melæna.	Pat. B. 30 c.cm. Mat. B. 10 c.cm. Pat. B. 50 c.cm. I.V. (scalp vein).	R.	A severe case.
61	M.	2nd	6 2	Normal vertex.	50½	Melæna.	Pat. B. 12 c.cm.	R.	..

(*d*) (Case 45) Blood examination (Dr. R. Chadwick) at time when slight hæmorrhage had just started: bleeding-time, 85 sec.; coagulation-time, 2 min.; red cells, 5,440,000; platelets abundant; red cells apparently normal; white cells, 13,600 (polymorphs 51 %, lymphocytes 43 %, large mononuclears 1 %, eosinophils 1 %, basophils 1 %, transitionals 3 %).

(*e*) (Case 47) Blood examination (Dr. Chadwick): red cells, 2,500,000; hæmoglobin, 40 %; bleeding-time, 2 min.; coagulation-time, 3½ min.; platelets, 140,000; white cells, 12,600 (polymorphs 75 %, lymphocytes 17 %, transitionals 8 %); 2 normoblasts seen per 100 white cells. Red cells show a little anisocytosis and polychromatophilia.

(*f*) (Case 50) Paternal grandfather and great-grandfather were said to be "bleeders." Two transfusions were given, and when the first was undertaken the patient seemed moribund—colour white like paper, air-hunger, gasping, and sighing respirations.

(*g*) (Case 51) On admission he was intensely exsanguinated and semicomatose; and bright red blood was coming from anus. An intramuscular injection (10 c.cm.) of blood was given while arrangements were being made for transfusion, but the child died before this was begun.

(*h*) (Case 57) Transfusion was not given until 36 hours after the bleeding began. By then the baby was extremely anæmic and dyspnœic, and was thought to be moribund. Hæmorrhage ceased at once and the patient's general condition improved very quickly. Weight at 4 months of age—14 lb.

events in the moderate and severe cases, is influenced chiefly by the rapidity and thoroughness of blood treatment. Consideration of my cases does not indicate that maternal influences, such as the age of the mother or the character of pregnancy and labour, affect prognosis, while it is noteworthy that infants of small weight were not specially vulnerable. Of the five who died, one (a twin child) was 5 lb. 2 oz. in weight, but the other fatalities were all in full-term babies of average weight. Four children who weighed less than 5 lb. 8 oz. at birth recovered.

TREATMENT

The mild form of the disease is undoubtedly self-limited, and the child will probably recover without any special treatment. Cases of average severity seem to respond satisfactorily to the intramuscular injection of human blood; but having admitted that the disease tends to be self-limited, it is obviously difficult to decide whether special treatment has played any definite part in the recovery.

Severe cases are urgently in need of intravenous blood transfusion, which is undoubtedly life-saving. It is not yet certain that these transfusions of blood have a specific action in controlling the hæmorrhagic disease; but even if they are not specific in their effect, at least they usually preserve life until the bleeding tendency has passed. Thus any criticism of this treatment is of theoretical rather than practical interest.

It is impossible to form any definite opinion whether a case, when first seen, is likely to be of slight, moderate, or severe degree; hence very close observation is essential.

The details of treatment given to the first 28 cases are set out in my second paper (1932); added experience has suggested certain alterations and modifications, and I shall therefore deal with the treatment of the last 33 examples only. Of these—

(1) *Slight or moderately severe* cases (25) were treated as follows:—

Blood injected intramuscularly ..	23
Blood not given	2

The average dose of blood given to each child was 36·6 c.cm. There were two deaths: one of these children received 100 c.cm. of blood and the other 66 c.cm. In both cases I criticise my treatment, for these babies should have been given intravenous transfusions of blood.

(2) *Very severe* cases (8) received intramuscular injections of blood (average dose 47 c.cm.), and when it was obvious that the hæmorrhage was not controlled, intravenous injections of blood were given. The average dose was 78 c.cm. and all these children recovered, though two were thought to be moribund when the transfusion was given, and in one case the operation was suspended for a few moments because the baby appeared to have died.

We have not met with even the slightest ill effects from blood transfusion in these cases, but it is admitted that the number of cases so treated is comparatively small.

The general plan of treatment now adopted is as follows:—

1. Umbilical or superficial hæmorrhage receives *local treatment*—e.g., retying of cord, application of adrenaline or tannic acid. Viper venom would be worth a trial, but I have not had an occasion for using it in this type of case.

2. *General treatment* includes observation of rectal temperature and heart-rate at half-hourly intervals; application of warmth by hot bottles or electric blanket; complete rest in the cot; and 5 per cent. glucose in drachm doses, given orally by spoon, to allay thirst.

3. An *intramuscular injection* of human blood (20 c.cm.) is given. The blood need not be typed, but it should be citrated (sodium citrate two-third grain to 10 c.cm. blood). The injection may be made into the outer aspect of the thigh, and it is wise to introduce the needle below the midpoint of the thigh, in a cephalic direction, in order that the puncture may be outside the napkin area and so out of danger of infection. When it is necessary to repeat injections different masses of muscle should be used, for instance, the deltoid region. If bleeding is not severe, as judged by the colour and general condition of the patient, as well as by the total volume of blood lost, further special treatment may not be required. If the child becomes restless again, or if more hæmorrhage occurs within two hours after the injection, a further dose (20 c.cm.) of blood is given intramuscularly, and provisional arrangements are made for a transfusion. These include (*a*) notification of an operator skilled in this type of treatment; (*b*) blood-grouping of infant and donor, and cross-matching of their bloods; (*c*) examination of the patient to find the most suitable vein, preferably on the scalp or foot.

4. If intramuscular injections have not been successful, a *transfusion* of 60–100 c.cm. of compatible blood is given. It is seldom that transfusion has to be repeated. In future blood transfusions will probably be used more frequently as treatment for the anæmia secondary to hæmorrhage.

5. In regard to the *feeding* of the child, there seems to be no danger in allowing the baby to return to breast milk as soon as the bleeding has ceased; this course is certainly less harmful than withholding fluids for fear that an ulcer may bleed again if alimentary peristalsis is stimulated.

6. Measures directed to the *repair of anæmia* and depleted blood-volume are started two or three days after bleeding has ceased; they are important because an anæmic infant is in constant danger of infections and of parenchymatous degenerations in vital organs—e.g., myocardium, liver, and kidneys. In severe cases, a blood transfusion (50 to 75 c.cm.) should be given; and in all cases iron (one grain of iron and ammonium citrate, in mixture form, twice daily) and a concentrated liver extract (one-half drachm twice daily by mouth) are beneficial. Later, full attention should be given to the provision of vitamins, and in the winter months treatment by artificial light may be ordered.

In conclusion I wish to thank the honorary surgeons and assistant surgeons of the Liverpool Maternity Hospital for allowing me to treat their cases; and I am indebted to my clinical assistants (Drs. Kathleen Wadsworth, W. F. Gaisford, and Muriel Duvall) and to the resident medical officers for their loyal coöperation. Miss I. Forshall, F.R.C.S.E., has performed most of the blood transfusions and it will be evident that the successful treatment of the severe cases was largely due to her conscientious assistance and technical skill.

Cases other than those treated in the Liverpool Maternity Hospital were referred to me by the following, to whom I wish to express my thanks (case-number shown in parentheses): Drs. Dingwall Fordyce (8), William Johnson (45), G. A. Garrett (29), W. D. Peock (47), E. R. Evans (50), L. Earlam (51), H. T. Nixon (11 and 26), B. A. Cowan (25), E. L. Roberts (27), J. W. Cowen (57), R. Jones (58), and the late Dr. C. G. Skinner (24).

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EFFECTS OF PROLONGED ŒSTRIN-STIMULATION ON THE CERVIX UTERI

BY S. ZUCKERMAN, D.Sc., M.R.C.S. Eng.
BEIT MEMORIAL RESEARCH FELLOW
(*From the Department of Human Anatomy, Oxford*)

THE reputed carcinogenic power of œstrogenic substances has lately been discussed in this journal in relation to possible dangers in the clinical use of œstrin.[1] So far the histological changes induced in the reproductive organs of women and monkeys by excessive or prolonged dosage with œstrogenic substances have not been considered by those who have participated in the controversy. The evidence of carcinogenesis is derived mainly from the study of "cancer strains" of mice, and refers chiefly to the mammary glands. More recently Loeb and his co-workers [2] have recorded a single instance of "cancer" arising during a course of œstrin injections, in the uterus, cervix, and vagina of a mouse belonging to a strain in which spontaneous cancer of any kind is rare. According to Perry [3] cancer of the uterus is a very uncommon finding in small rodents, and she describes three cases in which it developed, after 6–10 months of treatment, in mice which she was painting with benzene solutions of œstrone and of 1 : 2 : 5 : 6 dibenzanthracene. She does not state whether or not the strain she was investigating has a high incidence of spontaneous cancer. There is a likelihood that it has, since 43 per cent. of the colony developed carcinoma of the breast. Loeb and his co-workers are careful to point out that the change they describe cannot be categorically defined as malignant in view of the impossibility of knowing whether or not it would have continued if the administration of œstrone had been stopped. Perry, on the other hand, not only declares the change in her animals to have been "cancer," but also states, without giving the grounds for her belief, that it would not have occurred if only dibenzanthracene had been given.

Both women and monkeys react to prolonged and massive dosage of œstrone by the development of cystic endometrial hyperplasia.[4] The condition does not extend more caudally than the isthmus uteri, and competent authorities agree that the hyperplasia is in no sense a predisposing cause to uterine cancer.[5] Furthermore, œstrogenic changes can be reversed by withdrawing the œstrogenic stimulus, or they can be counteracted by means of some substance such as progesterone or testosterone.

Certain changes that are simultaneously produced in the cervix uteri of monkeys have, however, been regarded with suspicion, and it is necessary to consider them carefully. Overholzer and Allen [6] injected a group of six ovariectomised rhesus monkeys (*Macaca mulatta*) twice daily, for periods varying between 16 and 90 days, with from 50–100 rat units of œstrin. About once a week the cervices of these animals were traumatised by means of scissors, and in addition metal clips were attached to the cervices of some of the group (the number treated in this way is not stated). Towards the close of the experimental period, three of the animals were also given an extract of corpus luteum. A seventh ovariectomised monkey was subjected only to œstrin and corpus luteum treatment for 51 days, and was killed 33 days after the cessation of all injections. An eighth castrated monkey was subjected only to cervical trauma for 86 days. All the animals showed some hyperplasia of the cervical epithelium, and in most of them metaplasia had also occurred, the typical cells being replaced by clumps of stratified epithelium which had invaded the myometrium. Overholzer and Allen regarded these changes as "precancerous," and accordingly submitted their sections to Dr. Ewing of Cornell University for an opinion. Dr. Ewing's report was that the changes should be regarded as precancerous or as "early established cancer." [6] It is important to note that the metaplasia occurred not only in the animals that were both traumatised and given œstrin injections, but also in the one that was given œstrin and not subjected to cervical trauma. Indeed, Dr. Ewing's most unfavourable report applied to the latter animal. It is also of interest that the cervix of this animal showed many regions of infection, in addition to "epidermization" and areas of atypical epidermoid cells.

The process of epithelial metaplasia that occurs in the cervix of monkeys as a result of excessive œstrin-stimulation has since been studied by Engle and Smith,[7] who injected four ovariectomised rhesus monkeys daily with 200–800 rat units of œstrin for periods of 60, 80, 110, and 170 days respectively. All four animals exhibited the same process of metaplasia observed by Overholzer and Allen. The severity of the process was neither correlated with the total amount of œstrin administered nor with the length of the periods of injections. Engle and Smith point out that the squamous cells in the cervix are not connected with the vaginal epithelium. They

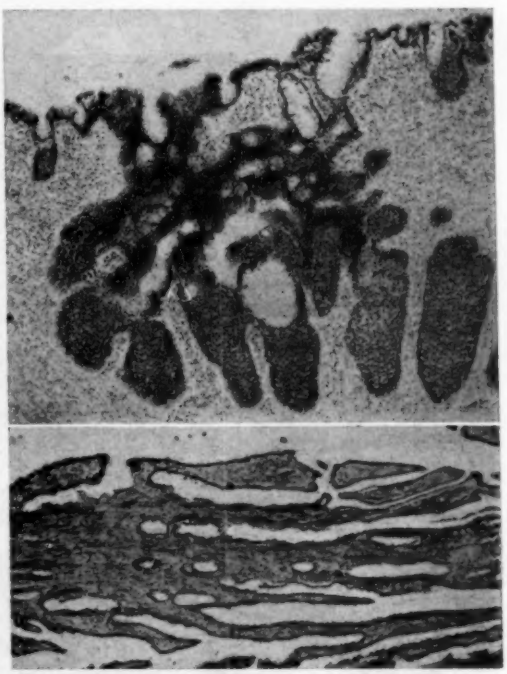

FIG. 1 (Top).—Blocks of irregular stratified cells derived from the cylindrical epithelium of the cervix of a monkey, OM 98, that had been injected daily for 365 days with 100 ♈ of œstrone. (× 45.)

FIG. 2 (Bottom).—Corresponding part of cervix of another monkey, OM 95, that had been injected for a similar period with œstrone, but with interruptions between courses of injections, showing normal epithelium. × 45.)

also believe that the replacement of the normal cylindrical epithelium is effected from proliferating groups of cells along the basement membrane. The metaplasia is an orderly process, and it is the opinion of Engle and Smith, and of a number of pathologists and gynæcologists who examined their sections, that the change presents "few of the characters of malignancy," no single instance being seen "where the direction of growth penetrated the supporting tissue." This opinion is thus contrary to that submitted by Overholzer, Allen, and Ewing.

AUTHOR'S OBSERVATIONS

A rhesus monkey (OM 98) in my own colony was injected daily with 100 γ of œstrone for 365 days—a period which so far as monkeys are concerned is twice as long as any thus far reported. The animal's cervix shows the same condition of metaplasia that is described above (Fig. 1).

As a rule the change in the epithelium begins in the deepest parts of the glands, which become filled with a plug of altered epithelial cells (Fig. 3). In some regions the normal cylindrical epithelium is heaped, and sometimes the plates of invading cells appear to be more columnar than squamous in character, especially in the peripheral parts of the metaplastic patches. No epithelial pearls occur in these patches which do, however, occasionally show degenerative changes. Mitoses are uncommon. There are no areas of infection, but leucocytes are occasionally seen both in the blocks of squamous cells, in the myometrium, and between the cells of the surface and glandular epithelium.

The process of epithelial growth appears altogether orderly, and the metaplastic patches are everywhere insulated from the myometrium by a definite basement-membrane (Fig. 3). In places the insulating substance

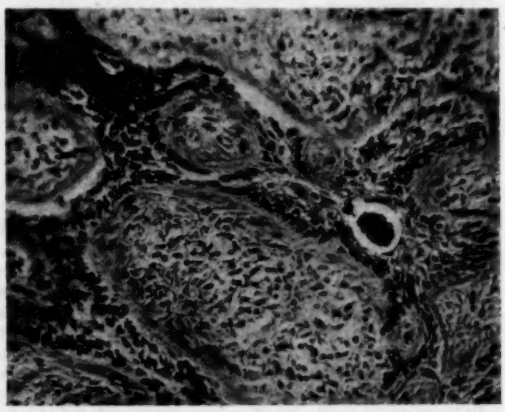

FIG. 5 (OM 98).—A thick homogeneous layer of "ground substance," free of nuclei, insulates the blocks of metaplastic cells from the myometrium. (× 250.)

is a thick homogeneous layer, which is presumably derived from the collagenous connective tissue, and which contains no nuclei (Fig. 5).

Neither Prof. G. W. Nicholson of Guy's Hospital, nor Dr. H. M. Carleton of Oxford, who very kindly examined the sections, regard the epithelial changes as either malignant or precancerous. Prof. Nicholson commented on the resemblance of the specimen to the condition of erosion of the cervix in women.

The fundus uteri is in a condition of cystic endometrial hyperplasia, and has been discussed elsewhere.[8] The vaginal epithelium presents the usual characters that are associated with œstrogenic stimulation, being deep, extensively cornified, and in process of rapid desquamation. The mammary glands, as well as several other regions of the body, were also examined microscopically, but no pathological changes were observed. It may also be noted that the animal showed no adverse reactions to the treatment during the year she was under injections, and that in this respect she was no different from some 30 other monkeys in my colony that have been injected daily with œstrone, with almost no remissions, for periods of between one and two years.

It would be expected, a priori, that the changes in the cervix, like those induced by œstrin in the uterus or prostate, are reversible. It may however be noted that one of Overholzer and Allen's animals exhibited a metaplastic cervical epithelium 33 days after it was last injected with œstrone. The total amount of hormone given was 2802·5 rat units. My own experience differs in this respect from theirs. A rhesus monkey (OM 95) received ten courses of œstrone injections over a period of 399 days, the total amount of hormone administered being 230,100

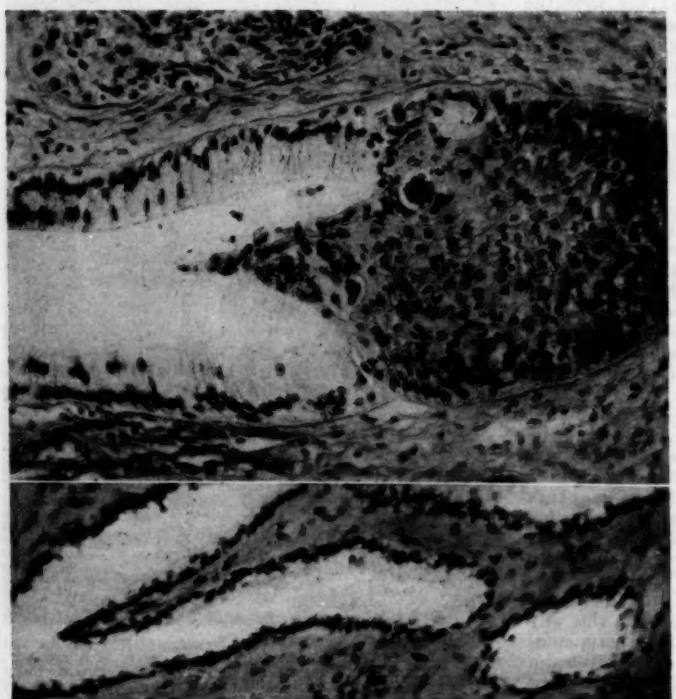

FIG. 3 (Top).—(OM 98.) A plug of cells derived from the cylindrical epithelium fills the base of a cervical gland. The basement-membrane is well shown. (× 250.)

FIG. 4 (Bottom).—(OM 95.) Normal cervical epithelium. (× 250.)

international units (at least ten times the amount given by Overholzer and Allen). The first seven courses lasted 40 days each and the last three 14, the intervals between the courses being the latent periods that precede the uterine bleeding which follows the administration of œstrone. The animal was given 322 daily injections during the entire experimental period of 399 days. The uterus was removed on the fourteenth day following the last injection.

The cervix of this animal is much smaller than that of the one which received 365 successive daily injections (cf. Figs. 6 and 7). Moreover, its epithelium is very little, if at all, different from the normal (Figs. 2 and 4). There are no plates of squamous cells of the kind seen in OM 98, and no signs of metaplasia except in the region where the squamous vaginal meets the cylindrical cervical epithelium, and where an intermixture of squamous and columnar elements cannot be regarded as an entirely unexpected finding.

The line of transition of cylindrical and squamous vaginal epithelium is normally very variable, and on the basis of a study of 11 specimens recovered from rhesus monkeys, Clark and Corner [9] have suggested that the zone of transition rises with increasing age. According to Koff,[10] on the other hand, it descends towards the vaginal fornices in human fœtuses during organogenesis. Koff quotes Robert Meyer's observation that the junction of vaginal squamous and cervical cylindrical epithelium always occurs at first in the cervical canal, and that the cervical epithelium then "destroys" the stratified cells as far as the external os. It was Meyer's belief that in about one-third of cases the process of replacement is so pronounced as to produce a condition of congenital erosion of the cervix. Whichever way the evidence is regarded, it thus indicates that there is a conflict between the two types of epithelium in the cervical canal. I have suggested elsewhere [11] that squamous hyperplasia can in general be regarded as a primary response of tissues in whose development the epithelium of the urogenital sinus has played a part. If the view that the primate vaginal epithelium is derived from the sinus is accepted (for discussion see [12]), the occurrence of metaplasia in the cervix following œstrogenic stimulation becomes understandable.

Even if such metaplasia be regarded askance from the clinical point of view, it is plain that the possibility of provoking such a change should not be considered a reason for advising against œstrin therapy in general. For in the first place it has to be remembered that the effects of œstrin are reversible, so that the normal condition of the tissues can be restored by withdrawing the hormone; and in the second, there can be little need in clinical practice for prescribing the hormone continuously over prolonged periods. The healthy condition of the uterus of OM 95, and the absence of any adverse effects in other monkeys that have received œstrin in successive courses of injections for periods of from one to two years, suggest that the best way of administering the hormone clinically would be in similar courses of injections lasting 2–4 weeks, intervals being left between the separate courses to allow of "œstrin-withdrawal" uterine bleeding.

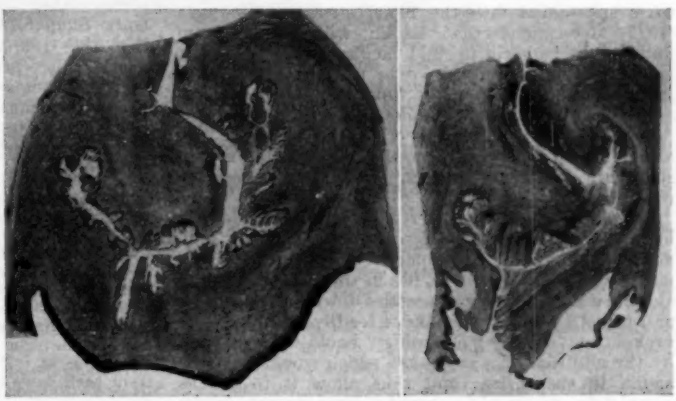

FIG. 6 (Left).—Cervix of monkey (OM 98) that received œstrone daily for a year. (× 3.)
FIG. 7 (Right).—Cervix of monkey (OM 95) that received œstrone for a similar period but in successive courses of injections. (× 3.)

SUMMARY

Metaplastic changes occur in the cylindrical epithelium of the cervix uteri of rhesus monkeys receiving œstrone injections for long periods (about three months), the columnar epithelium being replaced in places by squamous cells which invade the myometrium. The metaplastic process is an orderly one, and the patches of squamous cells are insulated by a remarkably thick basement membrane. The process does not possess the general characters of malignancy, and it is reversible. Thus it was not displayed by a monkey that was given œstrin daily in successive courses of treatment (totalling 322 daily injections) over a period of 399 days. It is suggested that in clinical practice the hormone should be given in courses of 2–4 weeks, with intervals between courses to allow of œstrin-withdrawal uterine bleeding.

The expenses of this study were defrayed from a grant kindly given by the Medical Research Council. The œstrone was generously provided by the Organon Company.

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UNIVERSITY OF SHEFFIELD.—The Rockefeller Foundation, New York, has made a further grant of £250 in aid of research in the department of pharmacology.

A COMPARISON BETWEEN THE ADSORPTIVE ACTION OF KAOLIN AND KAOLIN-ALUMINA MIXTURE ON FÆCAL BACTERIA

By William Smith, M.D. Camb.

PATHOLOGIST TO THE MILLER GENERAL HOSPITAL, GREENWICH

Kaolin (aluminium silicate) has been used for centuries in the East for the treatment of epidemic cholera. Walker (1921) showed that its curative action, in addition to being of a mechanical nature, was due to its power of adsorbing bacteria. He also suggested that this inert substance acted as a filter in the intestine, and thus prevented absorption of toxic substances into the blood stream. Braafledt (1923) determined that kaolin will adsorb large numbers of bacteria in fluid media, and also that it neutralises and thus prevents the toxic effects of such organisms as *Bacillus typhosus*, *Bacillus paratyphosus*, *Bacillus enteritidis* Gaertner, *Bacillus dysenteriæ* Shiga, and the vibrio of cholera; he also demonstrated its successful therapeutic use in such infections as cholera, dysentery, ulcerative colitis, and acute enteritis.

Kaolin, a chemically inert finely divided powder, has a very large surface combined with a high adsorptive power. An apparent disadvantage of its use in treatment, however, lies in the fact that kaolin alone in a liquid suspension settles down fairly rapidly, and forms a mass which cannot readily be completely broken up. If this "clumping" could be prevented by the addition of a substance which would hold the kaolin in suspension, and thus allow it to act as completely as possible, much improvement in its adsorptive powers might be anticipated.

It has been shown by Crohn (1929) that powdered aluminium hydroxide can be used as a substitute for other alkaline substances in the treatment of peptic ulcer. Aluminium hydroxide, however, possesses its greatest adsorptive power when in the colloidal state (gel), its action in the alimentary canal being due to this property of adsorption, and not to chemical neutralisation. A preparation containing a suspension of kaolin in aluminium hydroxide gel (kaolin-alumina mixture) therefore suggested itself. Such a preparation is found to be neutral, has great adsorptive properties, is tasteless, and odourless. Swalm (1934) showed that such a mixture, when added to a fluid medium, produces a much more voluminous and flocculent sediment than is the case when kaolin alone is used. The supernatant liquid of a suspension of fæces, in vitro, can be completely decolorised by a kaolin-alumina mixture, but only incompletely by an equal weight of kaolin alone.

EXPERIMENTS

In view of the finding that a kaolin-alumina mixture apparently is more efficient, as regards its adsorptive power, when compared with kaolin, it became of interest to determine whether such a mixture did, in fact, adsorb a greater number of bacteria than kaolin alone. The kaolin-alumina mixture used in the following experiments contained 20 per cent. aluminium silicate (kaolin) and 2·5 per cent. aluminium hydroxide gel. This was a similar strength to that used by Swalm.

In the preliminary experiments directed to this end, suspensions of fæces in water were prepared, and strained through butter muslin in order to remove any extraneous matter. To these suspensions equal weights of kaolin and kaolin-alumina mixture were added; the resulting mixtures were well stirred and then allowed to stand for 24 hours at room temperature. At the end of this period bacterial cultures were put up from which bacterial counts were made. These experiments did not indicate any very definite finding as to whether kaolin or the mixture had adsorbed the greater number of bacteria.

Some modification appeared to be necessary in the technique, in order definitely to determine if any difference could be detected in the power of adsorbing bacteria. That kaolin adsorbs bacteria is well known, and this property is made use of extensively in medicine. It seemed therefore desirable that further tests should be carried out at the temperature at which the substances are normally used—viz., body temperature—and further it seemed possible that the time factor might enter into the matter. During the preliminary experiments it had also been determined that, in order to make accurate bacterial counts possible, the fæcal suspensions would have to be comparatively weak. The technique finally adopted for these experiments was the following:—

A weak suspension of fæces was prepared and strained through butter muslin. Three measuring cylinders of 250 c.cm. capacity were taken, and each was filled with the fæcal suspension (Fig. 1). One of these (A) contained fæcal suspension alone, whilst to the second (B) 3 grammes of kaolin was added, and to the third (C) an equal weight of kaolin-alumina mixture (Fig. 1). The kaolin and kaolin-alumina mixture were well stirred into the suspension. The three cylinders were then placed in the incubator at 37° C., and at various intervals samples from each were taken from which bacterial counts were

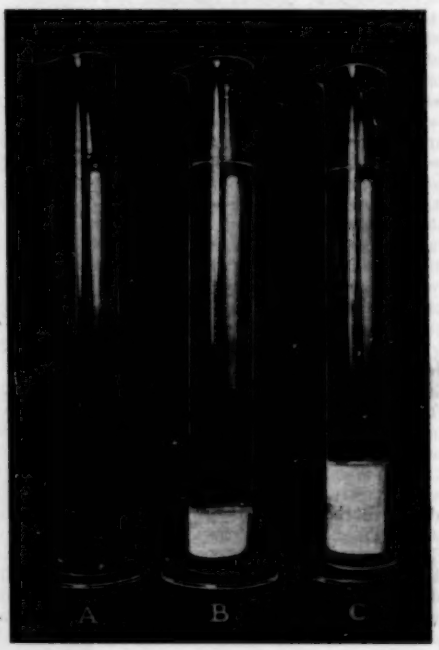

FIG. 1.—Cylinders filled with: (A) fæcal suspension alone; (B) 3 g. kaolin; (C) 3 g. kaolin-alumina mixture; note greater bulk of sediment.

made. After each sample had been removed the mixtures were again well stirred and the cylinders then replaced in the incubator.

METHOD OF MAKING THE BACTERIAL COUNTS

The principle was similar to that in use for making bacterial counts from samples of milk. The medium employed was peptone agar.

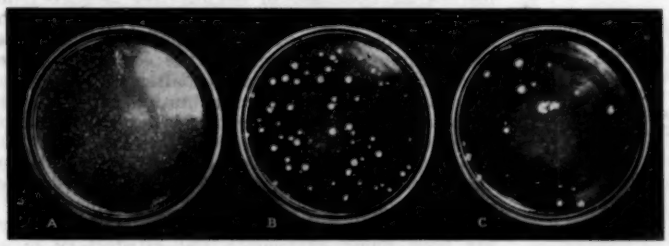

FIG. 2.—Cultures prepared from different dilutions of fluid in the cylinders shown in Fig. 1 (see also Table). (A) Fæcal suspension alone: 1/100 dil. (128,000 bacteria per c.cm.); (B) with kaolin: 1/10 dil. (10,400 per. c.cm.); (C) with kaolin-alumina: 1/10 dil. (2280 per c.cm.).

This was melted and then cooled to approximately 45° C. Accurate quantities of the sample to be tested were now added, the tubes containing the medium and the sample well shaken, and the resultant mixtures poured into a Petri dish. The medium was allowed to set, and then incubation proceeded for twenty-four hours before the counts were made.

For each experiment varying dilutions of each sample were employed. These were prepared similarly to the method used for the "plate count" of milk. The usual strengths used were undiluted, 1/10, 1/100, 1/1000, of which 1 c.cm. of each was added to a tube of peptone agar.

The actual bacterial counts were ascertained from the dilution which gave the most suitable growth for the purpose, and the figures quoted in the Table were obtained as a result of multiplying the actual dilutions employed by the number of colonies definitely present in the medium.

Table showing Growth of Bacteria in Fæcal Suspensions

Cylinder.	Time of incubation.	Test 1. Dilution of suspension.	Test 1. Bacteria (per c.cm.).	Test 2. Dilution of suspension.	Test 2. Bacteria (per c.cm.).
(A)	30 min.	1/100	67,000	1/100 (Fig. 2A).	128,000
	1 hr.	1/100	102,000	1/100	176,000
	24 hrs.	1/1000	3,200,000	1/1000	3,600,000
(B) Kaolin.		3 grammes.		6 grammes.	
	30 min.	1/100	19,200	1/10 (Fig. 2B).	10,400
	1 hr.	1/100	21,200	1/10	7,760
	24 hrs.	1/100	96,000	1/100	24,400
(C) Kaolin-alumina.		3 grammes.		6 grammes.	
	30 min.	1/10	4,080	1/10 (Fig. 2C).	2,280
	1 hr.	1/10	4,040	1/10	1,880
	24 hrs.	1/10	6,080	1/1	414

It was notable that when 6 g. of the kaolin-alumina mixture were used, not a single colony of *Bacillus coli* was obtained in the twenty-four hour culture. The *B. coli*, however, were still numerous in the similar culture using kaolin alone.

Using stronger fæcal emulsions having a definite coloration, Swalm's findings of the greater efficacy of the kaolin-alumina mixture in decolorising and removing the odour from the suspension as compared with kaolin alone were confirmed.

Hydrogen-ion concentration.—The possible explanation suggested itself that the more efficient adsorptive power for intestinal bacteria of the kaolin-alumina mixture might be due to an alteration in reaction. Control experiments, however, showed that there was no appreciable difference between the hydrogen-ion concentration of kaolin or kaolin-alumina mixture emulsions in water alone, or when these two substances were added to the type of fæcal suspensions used in the above experiments.

Effect of supernatant fluids.—A further possibility was that the supernatant fluids obtained after shaking kaolin or kaolin-alumina mixture may have some bactericidal value. Tests made in a similar manner to those employed to ascertain the Rideal-Walker coefficient were put through. The same amount of a culture of *B. coli* was added to varying volumes of the supernatant fluids. Glucose peptone broth was used as a culture medium. In no instance, even when only a small number of bacilli were introduced, was any evidence obtained that the growth of the bacilli introduced had been inhibited in any degree. Control experiments were made in each case in which there was no addition to the supernatant fluid.

CONCLUSIONS

Under the above conditions a kaolin-alumina mixture is more efficient than an equal weight of kaolin as an adsorbent for fæcal bacteria.

When an adequate amount of the kaolin-alumina mixture is present, an almost complete adsorption of the bacteria occurs with entire removal of the *B. coli*.

The explanation of these findings appears to lie in the "adsorption" quality, and not to be due in any way to a change in the hydrogen-ion concentration, or to a bactericidal effect of the supernatant fluid.

I am much indebted to my senior technician, Mr. J. W. Roberts, for taking the photographs from which the illustrations have been made.

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Clinical and Laboratory Notes

SERUM CALCIUM IN THE PSYCHOSES

BY I. ATKIN, M.D., D.P.M. Lond.
ASSISTANT MEDICAL OFFICER AND PATHOLOGIST, PARK PREWETT MENTAL HOSPITAL

WHEN assessing the chemistry of the blood in the psychoses care must be taken to exclude other possible causes of variation apart from that which may be due to the psychosis itself. Higher calcium values have been reported in diabetes, arthritis deformans, and syphilis; lower calcium values in nephritis, bronchial asthma, and uncomplicated heart failure. In the present investigation therefore patients suffering from any of these illnesses are excluded; in particular, syphilis was excluded by a routine micro-Meinicke test, and kidney disease by a blood-urea estimation and a microscopic examination of the urine deposit. Other conditions which are well

known to influence the blood calcium, such as rickets, tetany, and sprue, are not likely to be overlooked.

In order to obtain some idea of the accuracy of the technique utilised in this investigation (by the method of Kramer and Tisdall), eight solutions of known strengths varying from 7·15 to 13·32 mg. per 100 c.cm. of calcium chloride were made and estimations carried out. The error varied from + 0·55 per cent. to − 3·4 per cent., the average being − 1·28 per cent.

In the classification of the psychoses as they appear with the figures tabulated below, only pure clinical pictures were included; manic-depressive cases with schizoid features, for example, are omitted, as well as any case where the diagnosis for some reason or other appeared to be still in doubt.

Psychosis.	No of cases.	Range.	Average.
Schizophrenic.	70	9·0– 9·9 : 10 10·0–10·9 : 39 11·0–11·9 : 20 12·1 : 1	10·48
Melancholic	47	8·2– 8·9 : 2 9·0– 9·9 : 15 10·0–10·9 : 27 11·0–11·4 : 3	10·07
Manic.	13	9·6–11·8	10·55
Epileptic.	15	9·9–11·9	10·98
Dementia paralytic.	15	8·2–11·0	9·67

DISCUSSION

(1) If we take the normal range of variation as 9 to 11, it appears that there is a tendency for higher values in the schizophrenic states. This confirms a recent report by Minker-Bogdanova and others (1934), who also note progressively lower values with the advance of the disease. It should be noted that the great majority of the 70 cases here investigated were recent admissions.

(2) Of greater interest are the findings in the manic-depressive group, which exhibit lower figures for the depressed phase and higher for the manic phase. On several occasions this was confirmed by a serial investigation in a particular case, of which the following are three examples :—

	Depressed phase.		Lucid phase.	
A.	Feb. 6th ..	10·8	March 20th ..	11·0
B.	Feb. 12th ..	9·1	„ 20th ..	10·2
C.	May 1st ..	9·75	August 27th ..	10·4

That there is a parallel relation between the blood-calcium level and the emotional tone has been frequently suggested—e.g., by Laird and Stephen (1933)—high calcium values being associated with cheerful states and low with depressions. Among previous reports of such a correlation in the manic-depressive psychoses is that of Henry and Ebeling (1926).

(3) In the epileptic psychoses the blood calcium tends to higher values. How far the epilepsy itself and/or the type of accompanying psychosis contributes to this is very difficulty to say.

(4) Average values are found in dementia paralytica.

I wish to thank Dr. V. L. Connolly, medical superintendent of Park Prewett Mental Hospital, for permission to carry out this investigation, and Mr. S. Davenport, the laboratory assistant, for help in the technical work.

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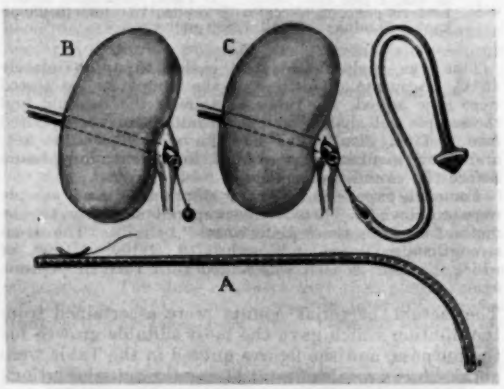
NEPHROSTOMY

BY SIR WILLIAM DE C. WHEELER, F.R.C.S.I.
SURGEON, ALL SAINTS' HOSPITAL, LONDON

TEMPORARY drainage of one or both kidneys has become an operation of comparative frequency in recent years. Many cases are on record in which nephrectomy appeared to be indicated but was avoided of necessity owing to the condition of the other kidney. Simple drainage often resulted in a surprising recovery. Again nephrostomy is indicated when a severe operation on the lower urinary tract is contemplated, just as colostomy is employed before extensive operations upon the rectum. Plastic operations upon the renal pelvis are also rendered more safe and secure if temporary drainage is employed.

The following technique for drainage of the kidney has been found convenient and satisfactory in a number of cases operated upon during the past few years. It is a modification of the Cabot method (Cabot and Holland 1931). The special instrument employed is a metal catheter with the top removed so as to provide a terminal eye (see Figure). A steel ball is held firmly in this eye by a thread pulled through the lumen of the catheter with a long stylet. The instrument was originally designed to aid in the repair of ruptured urethra (Wheeler 1929).



A.—A modified metal catheter with a steel ball fixed in the terminal eye by means of a thread passed through the lumen.

B.—The renal pelvis has been incised, the ball after acting as a guide is released.

C.—The ball has been cut off and the thread attached to a winged catheter.

The kidney is exposed, but free mobilisation is seldom necessary. A scratch is made through the capsule near the middle of the convex border. The instrument is passed through this minute incision via the renal cortex into the pelvis. The steel ball pushes forward the wall of the latter and acts as a guide for an opening. When this is made the thread is unhitched from the proximal end of the instrument. The ball is now released and removed. The thread is attached to a No. 22 or 24 French winged catheter and pulled upon until the end of the catheter enters into the terminal eye of the metal instrument. The latter is withdrawn carrying with it the rubber catheter. The winged portion slips into the pelvis and should lie in a position to drain the lower calyx and to pass straight outwards through the lumbar wound without angulation. No sutures are introduced to aid fixation or to close the pelvis.

In about a fortnight the tube may be removed with the aid of a stylet, which with traction on the tube narrows the expanded extremity. If further drainage is required a straight rectal tube is introduced immediately. It must be the same length as the original catheter measured from the point where it emerges from the wound to the expanded end. The winged catheter should be a shade larger than the metal instrument to ensure a tight fit in the renal substance, and so avoid bleeding.

By the method recommended there is no difficulty in finding the pelvis and manipulation of the kidney is reduced to a minimum.

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SPONTANEOUS (PATHOLOGICAL) DISLOCATION OF THE ATLAS

By G. H. Steele, M.S. Lond., F.R.C.S. Eng.

SURGEON TO THE ROYAL SURREY COUNTY HOSPITAL, GUILDFORD

Cases of spontaneous dislocation of the atlas are being recognised and reported with increasing frequency, and the following case appears to throw light on the ætiology of this uncommon condition, about which there has been some discussion.

A boy of 7 was admitted to hospital, exceedingly ill, with the history that 11 days before adenoid curettage had been performed; the tonsils had not been removed on account of the presence of boils elsewhere. A week later he began to complain of severe pain in the neck.

On examination he was lying in bed with a slight degree of torticollis and forward displacement of the chin, and screamed at any attempts at examination. He was obviously most sensitive in the region of the upper part of the cervical spine, and when he altered his position, which happened infrequently on account of his pain, he held his head steady with both hands. The temperature was 102° F., the pulse-rate 120, and the respirations 35. A diagnosis of inflammatory atlanto-axial dislocation was made and confirmed by radiography (Fig. 1).

Treatment.—Under general anæsthesia the head, neck, and chest were enclosed in plaster without any attempt at reduction of the dislocation. Under the anæsthetic the adenoid region was found to be still in a sloughing condition, but the anterior arch of the atlas was not felt to be unduly prominent.

Progress.—The temperature continued to swing between 101° and 104° F., and at the end of a fortnight a pyæmic arthritis of the left ankle developed as a painless swelling. Arthrotomy and lavage were performed, with subsidence of the ankle infection which, however, flared up again a month later and was then treated by open drainage. After the first operation the temperature fell to an irregular 99° F., and the condition of the neck was obviously greatly improved, but at the end of another month the child developed a painless pathological dislocation of the left hip (Fig. 2). This was treated by means of a strapping extension of 10 lb., decreased to 5 lb. after a few days when the dislocation was found to be reduced. The neck plaster and the extension were removed three months after admission. The plaster could probably have been removed a month earlier as it had become loose and the head movements within a small range were free and painless, but it was felt to be a useful safeguard. The boy was discharged with full use of all the affected joints a month later, four months after admission. An X ray examination at this date showed that the amount of displacement of the atlas remained unaltered.

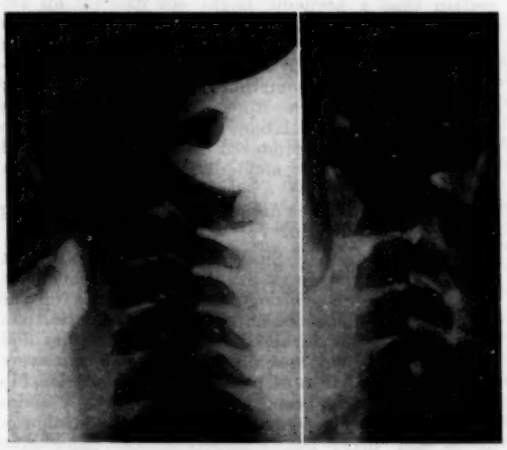

FIG. 1.—Radiograms showing pathological dislocation of the atlas. Left: before treatment. Right: on discharge four months later: displacement unchanged, but joints functionally normal.

FIG. 2.—Pathological dislocation of left hip in same case as Fig. 1.

A useful survey of reported and personal cases has been made by Watson Jones (1932). The patients are most commonly in the first decade of life, and a traumatic factor is absent or was very mild. The first reported case is that of a nurse who killed a patient with such a dislocation by turning the head a little to one side while doing a dressing. Another story has been told of a surgeon demonstrating a case to a class of students as a rheumatic torticollis; he mentioned inflammatory dislocation as a differential diagnosis, and said it was a very rare condition which could be diagnosed by the fact that if the chin was chucked the patient died, a remark which he proceeded to illustrate, with fatal results. The next case was also one of torticollis. Saying that in view of the rarity of the condition this could not possibly be another of the same, he killed the second patient likewise.

In all the cases there is an inflammatory lesion in the upper part of the neck—tonsillitis, naso-pharyngitis, suppurating glands, mastoiditis, and so forth. In the case reported here there was probably a septicæmia due to the boils, and this was responsible for the infection of the adenoid site. The infection had probably spread backwards by direct continuity, but according to Watson Jones the inflammatory focus causes a hyperæmia in the region of the base of the skull, softening the attachments of the transverse ligament of the atlas, which may be avulsed, the hyperæmia also accounting for the decalcification of the anterior arch of the atlas that may be present. Wittek (1908) calls the condition "distension-luxation," stating that it is a

distension of the bursæ between the odontoid process, the anterior arch of the atlas, and the transverse ligament, which leads to a stretching and weakening of the ligaments. The inference to be drawn from this case appears to be that the condition is similar to that of the inflammatory pathological dislocation which occurred in the hip, and in the words of Choyce (1932):

"Among the chief factors making for articular strength are the integrity of the joint surfaces and the tone of ligaments and muscles. If disease has weakened any of these . . . dislocation will readily occur. As a rule in pathological dislocations several agents are at work, though usually one predominates."

The typical clinical picture is similar to that in this case. A child complains of a stiff neck some days after, for instance, a throat infection, and is found to have a painful torticollis which he endeavours to protect by his own efforts. The anterior arch of the atlas may or may not be felt as a prominence in the nasopharynx, and radiography is the key to the diagnosis. For treatment, Watson Jones recommends reduction of the dislocation by extension and fixation in plaster. The dislocation, however, can of necessity be only moderate in degree if the patient survives, and since the patients are usually young children—and it is astonishing how children will compensate for slight or even severe bone and joint mal-alignment in the process of growth—it seems unnecessary to do more than to put the inflamed area at rest by means of a restrictive plaster, thus avoiding the risk of reduction. Blunck (1935) and Stammers and Frazer (1933) mention cases which have been treated in this manner with good functional results.

The moral of this story is that one should be on the look-out for the condition among the ordinary cases of acute torticollis; if there is any doubt, a lateral radiogram of the neck will remove it.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTIONS OF PSYCHIATRY AND MEDICINE

AT a joint meeting of these sections the chair was taken by Dr. T. A. ROSS, president of the section of psychiatry. A discussion on the relation between

Mental Disorder and the Activities of the Endocrine Glands

was opened by Prof. F. L. GOLLA. He supposed, he said, that no member would defend a pathogenesis of mental disorders based upon diseases of the ductless glands. There was very little evidence even that the symptomatology of mental disease was influenced by endocrine disorder. Recent work suggested that there were nerve-cells in the diencephalon which had a secretory function, and it might be inferred that their secretion was that which had been attributed to the posterior and possibly to the anterior lobe of the pituitary body. This research in itself opened a new vista of possible hormonic influences on the central nervous system. A number of "nervous systems" influencing one another by internal secretions would make the work of the psychiatric pathologist easier by releasing him from the task of explaining the influence of one system on another in terms of the old biophysics—excitation and conduction. There was not the faintest physiological evidence that any particular secretory disturbance accompanied any particular form of psychosis. For once, however, the histologist had the satisfaction of finding that the microscope gave him information which physiological methods would not. The gonadal system, and particularly the testicles, would sometimes show disturbances of structure which the pathologist had a right to assume were accompanied by corresponding disturbances of function. Sir Frederick Mott had shown the connexion of testicular pathology with schizophrenia. Failure of testicular function was not, however, responsible for mental disorder. Anyone who kept animals knew that a male animal suffered loss of function if deprived of the female for long enough. Studies of eunuchs throughout history showed that their deprivation delivered them from the stress which might lead to mental disorder.

Dr. Golla then showed a series of slides prepared by Sir Frederick Mott, illustrating the testicular disorders associated with dementia præcox. The testicle showed, progressively, reduced spermatogenesis, shrinkage of tubules, crinkling due to fibrosis, interstitial proliferation, thickening of basement membrane and lipoid in the interstitial tissue. For some curious reason nobody seemed to have given these observations the importance they deserved. In mental disorder one was dealing with a general profound bodily disturbance of which one feature was a disorder of conduct, and another was a disturbance of the endocrine system. The testicular changes, however, were very striking and were never found in other conditions.

If the male sex organs of an animal were wholly ablated and the animal were then given testicular extract or graft, the animal would sometimes show normal sexual behaviour. It must be concluded that the testicular hormone had a particular affinity for the nervous mechanism concerned in sexual acts. This was the only physiological support for a suggestion that a hormone might act directly on the nervous system. The pituitary syndrome, being under the governance of the diencephalon, did not offer direct proof of such hormonic influence. Endocrinologists seemed sometimes to forget that every organ received a nerve-fibre. The central nervous system was a most labile mechanism, and, if an effect could not be produced in one way, it would invoke another. An endocrine disorder might be imagined to produce a general hyper- or hypo-excitability, but it was difficult to imagine it affecting one particular function.

A paper written by Sir WALTER LANGDON-BROWN was read by Dr. S. LEVY SIMPSON. Endocrinologists, he said, since recognising the relationships of the pituitary and diencephalon, were less dogmatic than in the past. They realised that the endocrines and emotions influenced each other. Endocrines were not a common cause of psychoses; the relationship between them had been overrated. Indirectly endocrinopathy might contribute by causing disfigurements and other bodily abnormalities. Endocrine stigmata were not uncommon in mental disease, but were often coincidental. Psychoneurosis might often be benefited by correcting glandular disorders—

notably those of the thyroid. Thyroid medication had turned many patients from mental hebetude to normal functioning. The myxœdematous patient was apt to become morose and suspicious, projecting his own failures to function on to his environment. Occasionally he became maniacal; thyroid in such cases was curative. Hyperthyroidic patients showed irritability and a tendency to cry "O cursed spite that ever I was born to set it right," regarding themselves as the only righteous persons in an ill world. They indulged in nerve storms. Graves's disease had been well described as a state of continuous fear. Its causes were sex, sepsis, and emotional stress; the third of these factors might act through the hypothalamus and thyrotropic hormone of the anterior pituitary. Many psychological accompaniments of dyspituitarism were found both in excess and deficiency. Both the pituitary giant and the Fröhlich case tended to lack inhibitions. They showed off, stole, set fire to things, and otherwise tried to compensate for their feeling of inferiority. They were liable to live in phantasy. Alternations of confusional insanity and glycosuria had been reported and were explicable now that the diabetogenic hormone was recognised.

Addison's disease might be associated with apathy, inertia, irritability, and pessimism. Virilism from cortex tumours might cause loss of modesty and maternal instinct. Fear might become a dominant feature if the medulla were stimulated. Insanity from diabetes had now disappeared, but hypoglycæmia might produce mental symptoms ranging from excitement to mania and homicide. In hypoparathyroidism—in addition to tetany—there might be hallucinatory disturbances. Pineal tumour caused precocious mental and physical development in some instances, but more often feeble mentality later associated with epileptiform manifestations. Gonadal disturbances were frequent in dementia præcox. An insistently expressed egoism with resentment against the unappreciative world indicated hypogonadism. Very few patients with inadequate gonads escaped inferiority, which might develop into psychosis. At the menopause there was temporary over-production of prolan in an attempt to stimulate the failing ovary. A hypertrophied prostate removed normal sexual inhibitions, but there was no adequate evidence for a male climacteric.

DISCUSSION

Dr. A. P. CAWADIAS thought that Kretschmer had unwittingly confirmed Mott's work; his asthenic type was the hypogonadal. The male hormone and the anterior pituitary had a particular action in schizophrenia, but they were not causal. Every patient must be considered as an individual. Many mental disorders had been described as of endocrine origin on insufficient evidence. The basis of endocrinology was metabolism and biochemistry. Physicians should describe the mental phenomena of endocrine disorders, and needed more precision in doing so. All hormones acted on the nervous system.

Dr. F. A. PICKWORTH said that it was misleading to speak of the hypothalamus and pituitary as an endocrine unit, because many other glands were influenced by or acted through the hypothalamus. The pineal, adrenal, hypothalamus, and gonad could each and all cause pubertas præcox by an influence on the hypothalamic centre. The problem there was that of the relation between the hypothalamus on the one hand and the symptoms of mental disorder and the activity of endocrine glands on the other. Many cases of Simmonds's disease showed separation of the pituitary lobes by colloid or septic material. Pituitary activity was undoubtedly disturbed by septic material filtering through from the nose and nasal sinuses. Diplococci had been demonstrated passing up into the pituitary from the sphenoidal sinus. In 31 per cent. of cases examined, sphenoidal sinus sepsis had been demonstrated. There was no direct relationship between endocrine activity and mental disorder; the connecting link was capillary disturbances in certain parts of the brain.

Dr. A. S. PATERSON said that the work of Kurt Richter had a direct bearing on psychiatry. It was an investigation of spontaneous activity. Man's activity depended on various external factors but also on internal drive, and this factor had been studied in the rat. In the normal rat a definite rhythm of four days was seen in the female, its activity being maximum when on rut and being halved on each succeeding day. No other cycle was constant. The removal of certain glands—viz., the pineal, thymus, spleen, posterior pituitary, seminal vesicle, uterus, and cervix had no effect, but if the anterior pituitary were removed the rat became totally inactive. Some effect was produced by removal of the adrenal and gonad, but hardly any result appeared on removal of the thyroid. Injections of suitable glands greatly increased activity. It seemed that this conception of a spontaneous activity was a valuable one, based on scientific data. It had a bearing on manic-depressive psychosis. Some patients probably suffered from genuine failure of spontaneous activity.

Dr. T. R. C. FRASER described a case in which endocrine abnormalities had been found and which had been cured by removal of the abnormalities. The patient, a woman of thirty, suffered from neurasthenia, on which were superimposed catatonic attacks associated with disturbance of consciousness. She had an adenoma of the pancreas, and was relieved by its removal. Her symptoms were not explicable in terms of her blood-sugar level.

Dr. N. G. HARRIS pointed out that cases of thyrotoxicosis fell into three groups: those in which the thyroid was the primary factor, those in which the psychological side was the important one, and those in which the two went hand in hand. Much could be done by correlating the effects of treatment with the type of case. Women with menopausal depression might have normal menstruation, irregular menstruation, or none at all. The effects of endocrine treatment in the varying types should be correlated.

Dr. H. A. PALMER said that continuous narcosis was sometimes dramatically successful in mental cases. The question was whether or not the hypothalamic centres were touched in these cases. It might be possible to show that barbiturates were more successful than other sedatives, and this would prove that the hypothalamus was involved. There was a biphasic effect: something connected with the psyche and something connected with the hypothalamus. If the psyche could be given ten days' respite from fear by deadening the hypothalamus it would often be able to deal with the condition.

Dr. DORIS ODLUM referred to the menstrual exacerbation of symptoms in women. This was a strong point in favour of correlation between endocrine and psychological factors.

Dr. LEVY SIMPSON, in reply, said that prolactin seemed to influence the clucking and brooding of

hens, and that the pituitary prolan seemed to have some effect on sexual libido. The reciprocity of influence between mental processes and endocrines could not be over-emphasised. Shock might cause premature menopause and fear might produce amenorrhœa. Hyperadrenalism and emotion were well known to be associated; it had been said that all the emotions of a love scene could be produced by a dose of adrenaline. Many hyperthyroid cases did well on psychotherapy alone. A vagus type of hypo-insulinism might produce disorders of conduct. Loss of weight might be extreme. Anorexia nervosa threw some light on the subject, for it might present all the symptoms found in Simmonds's cachexia. One factor in their production was nervous, but the other was a vitamin deficiency. Animals on a vitamin-deficient diet showed atrophy of pituitary and adrenal—after a phase of congestion and hypertrophy. Speaking broadly of disorders of conduct and emotion, any observer must admit their frequency in endocrine disorders. They varied according to the underlying neuropathic tendency, but were definitely associated with endocrine disorders, which were by no means rare illnesses but occurred in nearly everyone. Very few had a "normal" endocrine balance. Endocrine changes were familial, constitutional, and racial. The post-menopausal woman whose pituitary and adrenal cortex had undergone hyperplasia took an entirely different and more virile, capable, original, and fearless outlook on life. She became a successful business director, perhaps the wife of the henpecked husband or the all-powerful matriarch. Another type was the pituitary adiposity of adolescence or later life: slim arms and legs, good teeth, a fascinating smile, a beautiful face, and a fat body. Such a woman was loved and loving, musical, often with a rich mezzo-contralto voice, and had great social activity. She was alternately happy and sad in a manner recalling the manic-depressive psychosis. With treatment the results were often so dramatic that it was hard to assume that anything but the endocrine factor had produced the change. In other cases some symptoms remained.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever group of this society held on Jan. 30th, Dr. H. S. BANKS, vice-president, being in the chair, a discussion on

Acute Enteritis

was opened by Dr. ROBERT CRUICKSHANK (North Western Group Laboratory, L.C.C.) with a brief review of the bacteriology and ætiology of the condition. In the investigation of this problem the closest coöperation between clinician and pathologist was essential. Material for examination (fæces, vomitus) should be sent to the laboratory at the earliest possible stage in the illness since invading pathogens were rarely found after the third or fourth day, although in dysenteric infections the organism might occasionally persist for several weeks. Where there was a likelihood of delay in transmitting the specimen, use should be made of 30 per cent. glycerin in 0·6 per cent. saline as a preservative. He advocated the more frequent use of the rectal swab. The patient's blood should be examined for specific antibodies between the seventh and twenty-first day. Although sometimes negative, the presence of specific agglutinins might confirm a diagnosis of Sonne or Flexner dysentery where nothing was found in the stools; a titre of 1/10–1/20 for the former and 1/50 for the latter would be diagnostic in children.

In dealing with the ætiology he suggested a division into infectious and non-infectious enteritis, although it was sometimes difficult to separate the two groups on clinical grounds. In infectious enteritis the important organisms were: (i) The dysentery bacilli, principally *B. dysenteriæ* Flexner and *B. dysent.* Sonne. While the former was usually associated with a true dysentery or ileo-colitis, the Sonne bacillus might cause gastro-enteritis or dysentery. The spread of infection—and the infectivity was often great—was by human contact or convalescent carriers. (ii) The salmonella organisms, of which the most common in this country was *B. aertrycke.* Animals were the main reservoirs of infection in this group, the mouse being a not uncommon carrier of *B. aertrycke* (or *B. typhi-murium*). *B. paratyphosus* B might be associated with a gastro-enteritis. (iii) *Staphylococcus aureus*, the importance of which as a cause of gastro-enteritis had been stressed by American workers. It was frequently a milk-borne infection and in the examination of suspected food bacteriologists should not neglect to look for it.

Non-infectious gastro-enteritis might be divided into primary and secondary types, the former being synonymous with summer diarrhœa (epidemic or zymotic enteritis) and the latter occurring as a complication of another infection, particularly measles and broncho-pneumonia. Summer diarrhœa affected particularly artificially fed infants of the poorer classes during the summer or autumn months; four factors—artificial feeding, infancy, unhygienic surroundings, and high temperature—combined to produce the disease. A raised external or internal temperature affected adversely gastric and intestinal secretions, so that in infants the initially low gastric acidity tended to be neutralised by the highly buffered cow's milk and the sterilising mechanism in the stomach and upper intestine was interfered with. The consequent ascent of coliform organisms from the lower bowel to this virgin soil, plus possibly bacterial infection of food, prevented proper digestion, and the general irritative action produced a gastro-enteritis. The use of low-buffered acidified foods would probably help both in the prevention and treatment of this type of enteritis. It was well to remember that breast-fed infants were practically immune.

Dr. M. MITMAN (Eastern Hospital, L.C.C.) said that diarrhœa was the pivotal symptom of enteral infections in children. Two other groups of alimentary disorders in which diarrhœa was a feature had to be excluded: those due to parenteral infections and those caused by digestive disorders. Distinction was not always easy. In some enteral infections, such as the enteric fevers and the dysenteries, the causative organisms were known. In others various organisms had been described but their rôle was in dispute. There remained a mixed group (gastro-enteritis, summer diarrhœa, cholera infantum, infectious enteritis, winter vomiting, alimentary toxicosis, &c.) in which specific micro-organisms could not be implicated but which behaved in all respects like transmissible diseases. There were pædiatrists who denied that infection played a primary part in these cases, but the evidence in favour of an infective origin was strong. Infections of known causation could usually be differentiated on clinical, bacteriological, and serological grounds. Clinical diagnosis

was usually most difficult in infants, in whom the typical syndromes might be replaced by a gastro-enteritis. Sonne dysentery and paratyphoid fever were examples. The diagnosis of parenteral infections depended upon the detection of the focus. In the remaining diarrhœas, differentiation was difficult in the absence of bacteriological and serological aids. Some assistance could be obtained from variations in the clinical syndromes, from biochemical changes in the stools, from the season of the year, and from involvement of other systems such as the respiratory tract and the middle ear. Changes, however, were not sufficiently specific to be an accurate guide to classification.

The practice at the Eastern Hospital was to segregate the dysenteries (almost exclusively Sonne) and congregate the remaining cases in an enteritis ward. This heterogeneous group had a fatality-rate ten times as great as the dysenteries. If, as seemed probable, these cases of enteritis included a number of infections of unknown causation, it was not justifiable to nurse them side by side in an open ward. It was also illogical to segregate cases of dysentery with a relatively low fatality-rate, and leave other infections, with a higher rate, together. It was, in fact, much more important to remove from an open ward a case of diarrhœa with a negative dysentery report than one with a positive finding. In the mixed group the mode of transmission was still uncertain. Infection by ingestion was probably the commonest method; but there was evidence that some, particularly those occurring in winter, were conveyed by droplets. This might explain the frequency of middle-ear and respiratory infections in some outbreaks of diarrhœa.

It was proposed in future to treat all cases at the Eastern Hospital by a combined cell and diet-kitchen technique. Every case of enteritis, whether primary or secondary to other infections, such as measles and whooping-cough, was to be treated as infectious; and each case was to be considered as a separate infection from every other case. Patients were to be nursed in separate cells. Feeds were to be prepared in a special milk room by a gowned, masked, and gloved nurse carrying out an aseptic technique. After use bottles and teats were to be sterilised in a special steriliser in the kitchen and passed through a hatch into a drying chamber in the milk room. Scrupulous care was to be taken in the disposal of excreta. Destructible squares were to be used where possible. Sluicing of foul linen was to be avoided as far as possible; if unavoidable the nurse was to wear a rubber apron, galoshes, and gloves, and forbidden to enter the milk room. By these measures it was hoped to minimise cross-infection in enteritis.

Dr. DAVID HALER (London) said the classification he favoured was a clinico-pathological grouping, based upon the clinical examination of the child and a careful bacteriological examination of the stool.

Group 1 with a high mortality, showing no abnormality in stools except for their frequency. The child was overwhelmed by a severe toxæmia or perhaps septicæmia. The normal ratio of coliform to lactic acid bacilli was maintained in direct films. Cultures showed no abnormality.

Group 2 with rather a lower mortality, associated with focal sepsis, and in these cases the disease was not so acute. The cardinal finding was a reduction in the lactic acid to coliform bacillary ratio.

Group 3 was a complex one associated with various organisms actually attacking the gut. The organisms might be cocci or bacilli, and comprised the usual enteral infections. Pus and blood were usually present in the stool.

Group 4 was associated with a depression of general bodily resistance by other diseases and invasion of the gut by proteiform bacilli.

The prognosis in Group 3 was relatively good; in Group 4 it depended on the associated disease. Groups 1 and 2 were truly parenteral. Group 3 and its subdivisions were enteral. Group 4 was secondarily enteral in character. He concluded by emphasising the extremely high infectivity of the true dysenteries and their relatively low mortality.

Dr. A. JOE (North Western Hospital, L.C.C.) said he was interested to learn that Dr. Mitman's precautions against the spread of intestinal infection (since he proposed to employ cell isolation) included those designed to exclude droplet infection. Those present, including himself, would probably be loth to give up the hypothesis of manual transmission as satisfactorily accounting for spread in the preponderance of cases, but the work of W. F. Wells in America, if confirmed, would reopen the whole question of air-borne infection. Under experimental conditions Wells had shown that intestinal organisms had maintained their viability in air currents when attached to droplet nuclei and these might account for such a rapidly spreading outbreak as described in Bristol by Parry and Peters. He himself had had one such experience, but had been unable to exclude the possibility of food contamination by a wardmaid who had had an acute attack of diarrhœa three weeks prior to the outbreak, which was not disclosed until a rapid succession of cases of Sonne dysentery caused the fullest inquiries to be made.

Dr. J. S. ANDERSON (Grove Hospital, L.C.C.) agreed with Dr. Mitman that, as far as the infectious diseases hospitals were concerned, diarrhœa was either infectious or not. As it was sometimes impossible to differentiate, every case of diarrhœa should be regarded as potentially infectious and isolated. He referred to an outbreak of twelve cases of Sonne dysentery, among which was a child ten months old, to whom attention was drawn on the occurrence of one green motion without other symptoms. That green motion on culture was found to contain *B. dysenteriæ* Sonne. He thought more attention should be paid to the anal toilet in children's wards and that members of the nursing staff should report at once even the slightest attacks of diarrhœa in themselves.

Dr. D. S. SUTHERLAND (Manchester) referred to cases of recurrent diarrhœa of dysenteric character admitted for investigation to a base hospital in Northern France during the latter part of the war. Other than the cases of bacillary dysentery which could be attributed to an organism of Shiga, Flexner, or Morgan type, or cases attributable to *Entamœba histolytica*, many were found to be due to amœbic infection. The pathological report in many of these indicated the cause as *Entamœba coli*, while other cases were reported as due to *Balantidium* (*Paramœcium*) *coli* and *Giardia* (*Lamblia*) *intestinalis*. Amœbæ might, he thought, be the cause of recurrent diarrhœa in this country.

A mild outbreak of dysentery occurred in October–December, 1935, in the wards of Monsall Hospital, mainly confined to two wards; of the 45 cases 41 were patients and 4 nurses. The disease was highly infectious but mild, with no deaths. The characteristic feature was frequent, relaxed, offensive stools. In 31 cases mucus was present in the fæces and in 18 of these blood was present in streaks; there was no altered blood. In 9 cases the stools were green. In 22 cases there was a rise of temperature

during the attack, the rise occurring on a few occasions before any change in the stools was noticed, and in others after the diarrhœa commenced. The temperature was raised in most cases for one day only, in 2 cases for five and six days; the rise was over 100° F. in 5 of the 22 cases, 2 reaching 104°. In 4 cases only was there abdominal pain; in no case was there vomiting. The organisms isolated in the cases examined were of the Sonne type. The source of the outbreak was not determined.

In searching for the source of such outbreaks he thought the organisation of the hospital kitchen should be inquired into. Dust originating from earth attached to unprepared vegetables might readily infect the food-supply, and he would like to see the preparation of food, particularly vegetables, completely separated from its cooking. Minced meat should be entirely used on the day of cooking; what was left over might readily harbour and grow organisms implanted by dust.

LIVERPOOL MEDICAL INSTITUTION

AT a meeting of this institution on Feb. 4th, with Prof. R. E. KELLY, the president, in the chair, a paper on the

Medical Treatment of Hepatitis and Cholecystitis

was read by Prof. J. W. MCNEE (Glasgow). He began by speaking of the definition of hepatitis, describing it as the response of the liver to injury. Apart from abnormalities and tumours, most of the hepatic disorders described in text-books under separate names could be united as examples of hepatitis. The pathological process varied from cloudy swelling in fevers, through fatty infiltration or degeneration, to the most severe hepatitis of all —necrosis of the liver cells or of large areas of liver tissue, the so-called acute necrosis (yellow atrophy) of the liver. Even the condition commonly known as cirrhosis of the liver was readily included as "chronic interstitial hepatitis," analogous with chronic interstitial nephritis. Various factors influenced the effects of hepatitis—whether this was acute or chronic, temporary or severe. The two most important were, first, the great excess of liver tissue over normal needs; and, secondly, the amazing power of regeneration of liver cells. The essential point in the treatment of all forms of hepatitis was to give the damaged liver the best chance to regenerate, and glucose was the only support we could offer it.

Turning to cholecystitis, Prof. McNee remarked on its commonness, and on its infrequent diagnosis in its earliest stages when medical treatment was of avail. The possibility of catarrhal cholecystitis must be considered in every case of indigestion not due to obvious organic disease of the stomach such as ulcer and not responding to simple treatment. The suspicion of cholecystitis was increased if flatulence was a notable symptom. From the standpoint of treatment it was important to know whether the infection was deep in the wall of the gall-bladder only, as surgeons suggested, or in its fluid contents. If it was in the wall, antiseptics excreted in the bile would be unlikely to have much therapeutic effect, and it would be preferable to use some remedy acting through the blood. In the diagnosis of catarrhal cholecystitis Prof. McNee attached great importance to the use of the duodenal tube to obtain samples of bile for microscopic examination.

Dr. N. B. CAPON referred to some of the forms of hepatitis seen in childhood, and supported the use of glucose in these cases, especially when combined with insulin.

Dr. R. E. ROBERTS, while agreeing with Prof. McNee that the information obtainable from cholecystography is sometimes unreliable, held that the help obtained in the majority of cases is more exact than that available from any other source. In a normally functioning gall-bladder or in a frankly non-filling gall-bladder, the presumptive evidence in favour of normality or pathology of the gall-bladder was very strong. In the case of opaque gall-stones direct radiography might suffice, but with non-opaque gall-stones cholecystography might provide incontrovertible evidence. There was, however, a type of gall-bladder in which the evidence given by oral cholecystography was open to criticism—namely, the type which fills well, empties normally, but throughout the examination shows a shadow of subnormal density. It was not at all clear whether the radiologist ought to regard such appearances as evidence of subnormal concentration and an indication of cholecystitis, or whether it was merely an indication of something amiss with the absorption of the dye from the bowel and with its subsequent excretion by the liver. So many factors had to be considered in the transit of the dye from the mouth to the gall-bladder that many possibilities in the nature of faulty absorption or elimination must if possible be excluded before the diagnosis of cholecystitis was made. Such exclusion seemed at present impossible without resort to intravenous cholecystography.

Prof. HENRY COHEN, in acknowledging the diagnostic value of duodenal intubation, nevertheless emphasised the importance of correlating the evidence it afforded with that derived from clinical and radiological investigation. Cholecystitis might be the sole manifestation of such lesions as gall-stones or neoplasms in the biliary tract, and its adequate treatment depended on a recognition of the underlying causative factors. Of the value of cholecystography he spoke feelingly, for it was in the Liverpool Medical Institution that he showed, with Dr. R. E. Roberts, the first series of cholecystograms taken in England. But as a clinician he was alive to its dangers. Pain in the right upper quadrant of the abdomen in the days before cholecystography was an exercise in careful anamnesis. Now too frequently the mere hint of discomfort in this area associated with slight flatulence led to a radiological examination of the gall-bladder and thence to cholecystectomy if gall-stones were revealed. But gall-stones were not uncommonly symptomless and their association with certain symptoms might be accidental and not causal. He had seen the gall-bladder and its contained stones removed for pain which later proved to be due to spinal tumour, caries, carcinoma of the lung, myocardial ischæmia, right pyelectasis, and other lesions which ought to have been recognised. He considered Prof. McNee's analogy between liver and kidney infections most helpful and proposed that it should be carried a step further. Might it not be that some cases of cholangitis and cholecystitis occurred independently of hepatitis, although the liver had excreted the infecting organism; might not the infection persist in the gall-bladder after the organism had ceased to be excreted by the liver? If so, it was to be expected that some cases of gall-stones with associated cholecystitis would show hepatitis whilst others would not. The hypercholesterinæmia of certain types of nephritis did not predispose to gall-stones. The medical treatment of established cholecystitis, apart from the mild catarrhal types which

might resolve without any treatment, was still on the whole disappointing. Judging by cholecystography appropriate foods caused biliary drainage as efficiently as concentrated solutions of magnesium sulphate. Massive doses of hexamine often produced gastric and urinary discomforts whatever dose of alkalis was given with them. Olive oil and Decholin allayed symptoms. Prof. Cohen doubted whether removal of the gall-bladder as a suspected source of focal sepsis was ever justified unless the gall-bladder itself was giving rise to symptoms which, even in the absence of general toxic disturbances, were severe enough to justify its removal. There was a danger in some centres of the gall-bladder becoming Bernard Shaw's "nuciform sac."

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a clinical meeting of this society held in Manchester on Jan. 22nd, Dr. J. W. BRIDE (Manchester), the president, being in the chair, a preliminary account of the working of the

Hormone Clinic at St. Mary's Hospital

was given by Dr. J. W. A. HUNTER (Manchester), who began by expressing his indebtedness to his colleagues at the hospital for permission to record the results. It was premature, he said, to draw any conclusions, but he hoped the results might be helpful to those who were considering setting up a similar clinic. During the first six months some 90 cases came to the clinic, most of whom being referred there from the out-patient departments. Some were deemed unsuitable for treatment; some had only commenced treatment in the latter weeks; but there remained 52 cases that had received sufficient treatment to justify a criticism of the results. The cases treated were as follows:—

Secondary amenorrhœa	20
Sterility dysmenorrhœa	6
Hypomenorrhœa	11
Menorrhagia of puberty	4
Pruritus vulvæ	5
Repeated miscarriage	3
Menorrhagia	2
Primary amenorrhœa	1

Of the 20 cases of secondary amenorrhœa 14 were temporarily cured, that is to say, the periods had returned after treatment by varying amounts of intramuscular œstrin; but in only 2 of these cases had the restoration of function been permanent. In 4 cases treatment in large doses had failed to restore the menstrual flow, a result at variance with those recorded by Kaufmann. In 5 cases of pruritus vulvæ associated with the menopause, 4 had been definitely cured by œstrin therapy. In 4 cases of adolescent menorrhagia 3 had been cured by treatment with ultramuscular progestin. In 17 cases of scanty menstruation associated with dysmenorrhœa or sterility, 11 had shown no improvement with prolonged treatment, and in 6 there had been some slight increase in the flow. In no instance had the dysmenorrhœa been affected, and no case of sterility had become pregnant. Three cases of repeated miscarriage had gone to term with progestin treatment combined with the administration of vitamin E. One case of primary amenorrhœa had been treated with large doses of œstrin but with no effect, but 2 cases of menorrhagia in patients thirty years of age had much improved under progestin treatment.

The preparations employed were supplied by Schering. In the cases of amenorrhœa he had used progynon B oleosum forte. The smallest dosage necessary in any case to produce a menstrual flow was 300,000 units, the largest amount required in any one case was 1,250,000 units. In menorrhagia of puberty the average monthly dose found necessary to control the menstrual flow was 10 international units. Most of the treatment had been replacement therapy; little had been done in the direction of activating therapy, using the pituitary hormones. As regards permanency the results had been disappointing, with the exception of menopausal pruritus, other climacteric symptoms, and adolescent menorrhagia.

The chief criticism of such a clinic, Dr. Hunter said, was that one tended to be working in the dark with no certain knowledge of the underlying conditions. Cases might be primary ovarian, or primarily due to pituitary deficiency, but apart from clinical signs we had no methods of establishing a diagnosis. He thought perhaps some help could be obtained by routine estimations of the basal metabolic rate, and also perhaps of the blood hormone content. For this a biochemical laboratory and a skilled staff would be necessary, and it seemed to him that future progress was only possible along these lines.

The PRESIDENT expressed his interest in the results.—Mr. J. E. STACEY (Sheffield) asked whether Dr. Hunter had discovered anything about what time in the cycle these hormones should be used. Personally he had seen good results in pruritus vulvæ. He thought that many of the effects obtained by substitute therapy were got as the result of psychological influences.—Dr. F. H. LACEY (Manchester) asked whether Dr. Hunter had ever compared the results in repeated miscarriages with those obtained from antisyphilitic treatment. His results in the latter had been very good, and he used the treatment whether the Wassermann reaction was positive or not.

In reply Dr. HUNTER said that in timing the treatment he had used Kaufmann's table, but unfortunately they had not been able to afford the huge doses used by Kaufmann. In his opinion menstruation tended to carry on so long as there was any hormone secreted at all. He thought that secondary amenorrhœa was due to a sudden cessation of hormone production. His series of repeated miscarriages had not had any history of syphilis. In most of his cases there had been a history of scanty menstruation. He believed that diet was a very important factor.

Pseudomucinous Ovarian Cyst with Cystic Endometrium

Prof. D. DOUGAL (Manchester) said that in the last few years he had met three cases with cystic changes in the endometrium associated with a pseudomucinous ovarian tumour. The ages were 58, 60, and 61. The first patient was single, but the others were married and had borne children. Each had a large abdominal cystic tumour and complained of a blood-stained vaginal discharge. In each panhysterectomy was performed, and the tumour was a pseudomucinous cyst-adenoma. In one patient an inoperable carcinoma of the descending colon was also present. On opening each uterus after operation a quantity of blood-stained pseudomucinous material was found on the endometrium—raised up to form a number of thin-walled cysts. In two cases this was also found in the cervix.

REVIEWS AND NOTICES OF BOOKS

Trachoma

By A. F. MacCallan, C.B.E., M.D., F.R.C.S., Surgeon in Charge of Out-patients, Westminster Hospital, London; formerly Director of the Egyptian Government Ophthalmic Hospitals. Embodying a Hunterian Lecture at the Royal College of Surgeons of England, 1936. London: Butterworth and Co., Ltd. 1936. Pp. 225. 21*s*.

FIFTY years ago any worker at Moorfields Eye Hospital would have been confronted with many cases of this disease, for most of the infected immigrants into East London from the affected districts of Europe at that time found their way there; but to the younger generation of ophthalmologists in England the disease is practically unknown. Only among those ophthalmic surgeons who have undertaken hospital duties in Egypt, Palestine, or the Far East are British "trachomatologists" now to be found.

The natural evolution of trachoma was first described by MacCallan in 1905, when he was working in Egypt, as occurring in four stages. These stages are now generally accepted and together with certain varieties which occur in Stage II are well described and illustrated with coloured plates in this book. The early diagnosis of the disease depends in difficult cases on the detection of pannus. This, which in the early days was apt to be regarded as only a later complication due to mechanical contagion from the heavily infected upper lid to the cornea, is described by MacCallan as a sign invariably present even in the first and second stages. Unfortunately its presence or absence in early cases can only be verified by the corneal loupe or the corneal microscope with slit-lamp in skilled hands; this examination takes some time, so that where mass infection has to be investigated the method is impracticable. It is, however, the only reliable criterion according to MacCallan, who attributes the infection of the cornea not to direct contagion but to slow and inevitable advance from the original site of infection in the conjunctiva of the upper lid. As to treatment, detailed instructions are given, varying according to the stage and particular variety of the disease. These display a great advance over the days when the almost universal panacea was the drastic and cruel copper sulphate stick.

As to the pathology of the disease, a vast amount has of late years been published in support or in criticism of two theories of causation: one that it is to be found in the so-called Halberstädter Prowazek Körperchen (H.P.K.) structures found to be included in the epithelial cells, the other and more recent one that it is due to an organism known as *Bacterium granulosis* discovered by the Japanese bacteriologist Noguchi. Neither of these theories has been found to be capable of proof and knowledge of the ætiology of the disease remains incomplete.

The latter half of this work is occupied with the epidemiology of the disease, its history, and a discussion of the prophylactic measures best adopted on the one hand for individuals living in infected areas and on the other to the schools, &c., in areas where the disease has already or has always been endemic. For a great part of the world the disease appears to be a universal scourge and there appear to be no natural conditions, either geographical or racial, which by themselves can render any area immune. At the same time no student of this book can regard the fight against trachoma as hopeless. Great improvement has already followed from the systematic prosecution of prophylaxis under scientific guidance in Egypt, and a victory on a smaller scale is the elimination of the disease from our own poor-law schools in England since segregation was adopted.

Pathological Physiology and Clinical Description of the Anæmias

By William Bosworth Castle, M.D., S.M., Associate Professor of Medicine, Harvard University; and George Richards Minot, M.D., S.D., F.R.C.P. Edin., Professor of Medicine, Harvard University. Edited by Henry A. Christian, A.M., M.D., LL.D., Sc.D., Hersey Professor of the Theory and Practice of Physic, Harvard University. London: Humphrey Milford, Oxford University Press. 1936. Pp. 205. 15*s*.

THE pioneer work of George R. Minot and William B. Castle on Addisonian pernicious anæmia laid the foundation for an entirely new conception of the ætiology of a wide group of conditions associated with abnormalities of the hæmopoietic system. It is therefore fitting that their review of the problem of the cause and treatment of the anæmias should be reprinted from the Oxford Loose-Leaf Medicine in a form easily available to workers in medicine and allied sciences. The short introductory chapter on the physiology of the erythron contains a stimulating account of the processes of blood production and blood destruction. It illustrates well how much can be learnt of the processes of normal physiology by the exact quantitative study of pathological conditions as seen in clinical practice. The hospital ward, in the hands of men like Minot and Castle, becomes a place in which as exact a science is practised as in the laboratory of the physicist or chemist. In this monograph the authors give a concise description of diagnostic technical methods and an analysis of the significance of the reticulocyte response, but emphasise that "it is important to recognise clearly that meticulous descriptions of the peripheral blood in themselves often signify little without correlation with clinical syndromes and in particular with the chronology of proceedings symptoms and therapy."

The anæmias are classified on an ætiological basis as far as possible. Congenital anæmias of infants, Cooley's erythroblastic anæmia, aplastic anæmia, the macrocytic anæmia of liver disease, and splenic anæmia are grouped together as idiopathic. Macrocytic anæmia associated with liver disease and achrestic anæmia, they suggest, are not due to a derangement of the internal metabolism of the P.A. principle, as is usually believed, but are dependent upon some, at present unexplained, depression of erythropoiesis. Myelophthisic or leuco-erythroblastic anæmia is regarded as due to mechanical interference with the blood-forming organs. The exposition of general principles of treatment is admirable in its clarity and the necessity of making a correct diagnosis before the blood picture is obscured by indiscriminate therapy is emphasised. Specific treatment is discussed under the headings blood transfusion, abolition of blood loss and increased blood destruction, administration of essential erythropoietic factors, elimination of toxic agents, X ray and arsenic treatment, and splenectomy. Apart from general principles notes are also given on the special treatment of certain types of anæmia. There is an excellent bibliography but a fuller index would have been helpful, for it is

a book that will be used for constant reference as well as read as a whole for the picture it gives of the principles underlying the modern diagnosis and treatment of the anæmias.

The 1936 Year Book of the Eye, Ear, Nose, and Throat

By E. V. L. BROWN, M.D., Professor; LOUIS BOTHMAN, M.D., Assistant Professor, of Ophthalmology; GEORGE E. SHAMBAUGH, M.D., Clinical Professor Emeritus; ELMER W. HAGENS, M.D., Assistant Clinical Professor; and GEORGE E. SHAMBAUGH, Jun., M.D., Clinical Instructor, in Otolaryngology, University of Chicago. Chicago: The Year Book Publishers; London: H. K. Lewis and Co., Ltd. Pp. 632. 10*s.* 6*d.*

THIS issue consists of abstracts from the current literature excellently edited and well written by the same authorities who have undertaken the task in recent years. Editorial comment is not withheld, and critical attention is given to therapeutic claims. For example, the treatment of otosclerosis by local injection of thyroxine is discussed in connexion with the late Dr. Albert Gray's original claim to have obtained seven cases of improved hearing among fourteen patients by the use of this method. The editors have tried the method "in a few cases," using the audiometer to test the hearing, and have found in no instance any significant alteration in the hearing. If the audiometer tests are made by a technician, the results are comparatively free from errors which are almost bound to arise with the whisper test. They say that with the slightest encouragement each patient would have declared that the hearing seemed improved, and they believe that it is this psychological element in deafness which is responsible for the continued vogue of all kinds of methods in the treatment of otosclerosis. In this connexion they quote a report by H. C. Ballenger and B. A. Patterson, who treated 25 partially deaf patients with an instrument similar to, but apparently not identical with, that of Zünd-Burguet, using the 2-A audiometer to follow the acuity of hearing. In only five patients was there any improvement: in two of these it was so slight as to fall within the normal range of variation; in one treatment began three weeks after an acute suppuration; and the remaining two were cases of chronic catarrhal otitis in which spontaneous improvement is more likely to occur than in otosclerosis or nerve deafness. A number of abstracts are given concerning petrositis, which has recently attracted much attention.

Much interesting work has been published during the year under review on diseases of the nose and throat, including Henri Coutard's recent report on the results of treatment of cancers of the tonsil, pharynx, and larynx by X rays according to his own method. The best five-year results, of 32 per cent., were obtained in the tonsillar region; tumours of the larynx gave 25 per cent., and of the hypopharynx 11 per cent. The editors point out that a new era has been opened up by Coutard's work; five-year cures are being obtained with gratifying frequency in cases previously deemed hopeless; the indications for surgery are being narrowed to intrinsic carcinomas of the larynx and to a few early lesions elsewhere.

With regard to diseases of the eye, a useful collection of abstracts on glaucoma includes a long illustrated article by C. Berens describing his operation of iridocorneosclerotomy for the relief of this disease. In a study of optic nerve atrophy in relation to pituitary tumour, F. Fischer finds temporal pallor of the disc the most frequently observed alteration in the nerve-head; he also finds that this pallor remains unchanged, no matter how good are the results of operation, an observation not in accord with the findings of other authors. A number of rare neoplasms of the choroid are described, and E. Hesse reports a favourable result in the treatment of methyl-alcohol amblyopia by repeated lumbar puncture; as a result of prohibition this affection was far commoner a few years ago in the United States than in England.

The book is provided with a good index, and is indispensable to those who want to keep track of progress in these specialties.

Chronic Indigestion

By C. J. TIDMARSH, M.A., M.D., F.R.C.P. (C.), Associate in Medicine, Royal Victoria Hospital, Montreal. London: Longmans, Green and Co., Ltd. 1936. Pp. 143. 6*s.*

THIS small handbook is described on its yellow and red wrapper as "a layman's handbook"; above the title is written with a large question mark, "Are you one of the 10 per cent.?" and beneath is the alarming announcement "ten per cent. of all people are affected by ulcers of the stomach." Whether such a statement is precisely accurate is of less importance than the effect such information may produce upon the reader. Books designed as this one is for both patient and physician have the object of helping the patient "to take an intelligent interest in his case," and thus to secure his coöperation, but they tend as a whole rather to encourage a morbid preoccupation with symptoms. Peptic ulcer is, however, one of the conditions in which the patient's coöperation is all-important, and where the physician feels the need of written instruction to supplement his verbal ones. Dr. Tidmarsh's little book, shorn of its cover, should serve the purpose. His teaching is sound, and he gives useful advice as well as timely warnings against incautious treatment. Physicians may themselves find a use for this book as a summary of the problems of chronic indigestion. The chapters on nervous indigestion and the unstable colon are especially good.

Hay Fever

With Special Reference to Treatment by Intranasal Ionisation. By CLIVE SHIELDS, B.M., B.Ch. Oxon., Clinical Assistant, Physiotherapy Department, St. George's Hospital. London: Humphrey Milford, Oxford University Press. 1937. Pp. 57. 7*s.* 6*d.*

IN this little book the author argues the superiority of intranasal zinc ionisation over other methods in use for the treatment of hay-fever. He does not describe the technique of desensitisation by pollen extracts, he does not mention the galvanocautery, and he condemns without reserve all kinds of palliative local applications. Records have been kept of the previous treatment received by his patients, from which Dr. Shields has drawn up a table showing that 82 per cent. of those who had had desensitising injections, and 100 per cent. of those treated by cauterisation, had experienced no relief. It is not surprising that a large proportion of his patients are people who had failed to get relief from other methods; the figures are of no value in assessing the

results of these methods. The technique recommended is similar to that used by other workers: three treatments of 8–10 mins. at weekly intervals, with a 2 per cent. solution of zinc sulphate, and a maximum current of 3 milliamperes for the first treatment, 7 milliamperes for the second, and 15 milliamperes for the third. Dr. Shields very properly lays stress on the importance of careful application of the zinc-moistened gauze to the upper and back part of the nares, and on the avoidance of necrosis by the use of small doses of current. He says he obtains 90 to 100 per cent. of relief in 93 per cent. of cases, whereas other observers have been content to claim 66 to 80 per cent. The method is a useful one, and it is probable that those who have had bad results from it have employed a faulty technique or applied the packing unskilfully. But the value of this book is impaired by over-emphasis on the merits of one form of treatment to the exclusion of all others.

Synopsis of Diseases of the Heart and Arteries

By GEORGE R. HERRMANN, M.D., Ph.D., Professor of Clinical Medicine, University of Texas. London: Henry Kimpton. 1936. Pp. 344. 17*s.* 6*d.*

THE systematic consideration of heart disease in this book opens with a discussion of the study of a patient suspected of heart disease. This section, specially in its dealing with symptomatology, is one of the best in the book, although the list of possible findings in examination is rather too exhaustive. In classifying morbid conditions of the heart the outlines approved by the American Heart Association have been followed, and diagnosis is considered from ætiological, structural, and functional standpoints in turn. When it is remembered that many patients seeking advice for troubles apparently cardiac have no disease but only a functional disturbance of the heart or its nervous mechanism, it is surprising that more systematic consideration is not given to this group, which includes the very common left mammary pain, nervous tachycardia, and suspirious as well as the effort syndrome. Dr. Herrmann has compressed a great deal of information into a relatively small space. Many useful diagrams and charts have been included, together with good photographs of morbid anatomy and microphotographs. Much attention to important detail has been given in therapeutics and management in heart disease and failure. But the volume is hardly as comprehensive as the title would suggest because the discussion of peripheral vascular disease occupies only nine pages. The value of future editions would be much enhanced by an elementary treatment of the symptoms and signs of the common forms of arterial disease; a precise account of the reactive hyperæmia test, for example, is of far greater importance than a picture of the Tycos Dermatherm.

Diseases of the Nails

By V. PARDO-CASTELLO, M.D., formerly Assistant Professor of Dermatology, University of Havana. London: Baillière, Tindall and Cox. 1936. Pp. 178. 16*s.*

THERE will be no two opinions on the merits of this little volume, and few will read it without profit to themselves and a measure of gratitude to a painstaking and able writer. The subject of this book, owing perhaps to the poverty of our therapeutic armamentarium, has been neglected too long, and even the trained dermatologist, "often at a loss to make a diagnosis," as Howard Fox remarks in his foreword, has been apt to underestimate its importance, both in his clinic and in the lecture room. A further obstacle to study is the involved nomenclature, mainly Greek in its origin, and therefore antagonistic to all but those of us who succeeded in reaching the "Vth form on the classical side." Dr. Pardo-Castello will be found to have made things very easy for the reader; he has a lucid and most attractive style. Two simple diagrams clarify in the ungual anatomy what has always appeared rather complicated. These diagrams should be carefully studied and memorised, or redrawn from memory, because constant reference to the parts depicted—i.e., nail-bed, matrix, nail-root, lunula, and so forth—is made in the seven succeeding chapters. These deal with affections peculiar to the nails, dystrophies, congenital affections, the effects of cutaneous and systemic diseases, occupations, and poisons. An extensive and carefully selected bibliography will stimulate the interested reader to further study or research, and the 94 clinical illustrations will be found invaluable. The treatment of nail diseases by X rays is considered specially in a final chapter. A word of warning is appropriate here. The value of radiotherapy is considerable, but in the hands of the inexpert it has inflicted irreparable damage in just this type of case.

A Textbook of Physiology

For Medical Students and Physicians. Thirteenth edition. By WILLIAM H. HOWELL, Ph.D., M.D., Sc.D., LL.D., Emeritus Professor of Physiology in the Johns Hopkins University, Baltimore. London and Philadelphia: W. B. Saunders and Co., Ltd. 1936. Pp. 1150. 30*s.*

THE general scope and character of this excellent text-book were recalled in these columns when the twelfth edition appeared in 1934. The thirteenth edition bears the brief legend "thoroughly revised," and has a preface which does not enlarge upon this text except in an impersonal way. The author disdains to act as his own commercial traveller, or to display self-pity at the magnitude of his task, which has been conscientiously performed. The changes which have taken place in our knowledge, for instance, of the vitamins, the hormones, the autonomic nervous system, and the cerebrum, all find a place, and the sections describing them seem to fit naturally into the text. Less space is devoted to the properties of reflexes and a little more to the anatomy of the nervous system than is customary, and the chemistry of the foodstuffs needs supplementing by reference to a biochemical text-book, but these can hardly be called defects. One of the main features of the book is its convenient size; no part of the subject is neglected, and the balance has been maintained with skill. The style is straightforward and the exposition clear; the size of the book prohibits very detailed discussion, but accuracy is not sacrificed to clearness. It must be borne in mind by the student that the text-book comes from the other side of the Atlantic, and he may find the emphasis and arrangement unfamiliar in one or two places. But it contains practically all he requires in a small compass, and avoids many of the usual defects of a short book. It is adequately but not profusely illustrated, well indexed, and has a useful detailed table of contents showing the subdivisions of the chapters and the pages on which they occur.

THE LANCET

LONDON: SATURDAY, FEBRUARY 20, 1937

THE ADOLESCENT IN INDUSTRY

ANY medical man who was fortunate enough to hear the two-days' debate in the House of Commons on the second reading of the Factories Bill must have been impressed by the desire in all parts of the House to ensure the healthiness of industrial life, and especially to protect the worker of tender age. But he could not fail to have been also impressed by the scarcity of scientific or medical data on which to base a reasoned judgment on the proposals before the House. What is the effect upon the adolescent of long hours or of night-work? What are the precise conditions under which young persons of either sex can play their part in industrial life without risk to their present health or future development? It must be admitted that scientific medicine can give no categoric reply to these questions. They cannot be answered in terms of established disease and defect, and despite the pioneer work of the Industrial Health Research Board and of the London School of Hygiene a start has hardly been made in the biology of healthy industry, for there has been next to no opportunity for continuous medical supervision from the inside. And in any case the problems of industrial health are economic as well as medical. Nevertheless there are biological principles known to medicine which can only be neglected at our peril. We are aiming at a healthy industrial life for the adolescents, and the hygienic conscience cannot be stifled by the lack of evidence that illness is being caused by this or that process or time-table. If the Factories Bill does nothing more than establish conditions which will not "cause manifest disease," most of the effort expended in the campaign for physical fitness and much of the work of the Ministry of Health and the Board of Education will be sterilised.

There are at present some 900,000 young persons of 14–18 years of age working in factories, not counting those in unregulated employments. Under the new Bill, as drafted, boys and girls under 16 years of age may work 48 hours a week but not longer; furthermore, the Secretary of State can by regulation prohibit or limit overtime for juveniles of 16–18 "in any process in which overtime can be shown to be prejudicial to their health." We shall all agree that these provisions are an advance on existing practice, but medical men will ask whether, except in rare and extreme cases, it will be possible to demonstrate the "prejudice to health" which overtime or night-work may cause. Neither young workers nor, as a rule, their parents desire that overtime should cease: experience shows that the incentive of the added pocket-money is apt to outweigh all other considerations. Any ill effect which long hours or lack of sleep may have upon the health of these juveniles will not become apparent until after they have become adults and the law has ceased to apply to them—when it will be too late to amend the error. For example, BRADFORD HILL, in his studies of sickness amongst operatives in Lancashire spinning mills, says: "There is no evidence of an excess of respiratory illness amongst younger workers who have only worked under modern conditions (except perhaps in the higher rates of single women 25–29)," but he adds, "this is not conclusive that modern conditions do not cause respiratory illness, since it may be that some years' exposure is necessary before the effect of the environment will be shown in absence from work due to illness." Again R. M. FLEMING, speaking of the adverse influence of certain environmental conditions upon the physical and psychological development of adolescents, says: "The adverse effect of an improper midday meal was not immediately apparent, but its effects were cumulatively felt, so that a second year of such conditions reflected itself in stunted growth." It has been urged that overtime or night-work need not affect nutrition. Medical experience suggests that they do affect nutrition in a variety of ways; and in any case nutrition is only one of the many environmental and physiological conditions which together determine the adolescent's health and development. School medical officers have observed and recorded the harm done by lack of sleep upon growing children. Wise parents and family doctors are very familiar with them. If it is asserted that it is harmless for juveniles of 16–18 to work at night or to exceed the usual working hours, medical men will be cautious of agreeing with the assertion. It is true enough that the effects may be difficult to demonstrate. It is hard to tell what the young person would have been like in a different environment—although comparison may fairly be made with those in public schools or with continuation-class groups—and the effects may not be manifest until early manhood. The years 16–18 are an important part of the formative period of adolescence; they include the latter end of the "second period" of rapid growth which FLEMING has so carefully studied. Mistakes in this period are irretrievable.

If it is really necessary that young persons should work either at night or overtime it appears that there is less danger in allowing young girls (between the ages of 16–18) to do this kind of work than in allowing youths of the same age to do it. At the age of 14–16 girls, as MORGAN ROCH of Harvard has pointed out, are more mature than boys. From 16–18 years, and over, most youths are growing with greater rapidity; for girls the period 11–16 years is determinant. Biologists like W. VON GONZENBACH of Zurich have emphasised the necessity of minimising the external life-changes during the pressure of internal change which takes place during puberty, if physical or mental disturbance is to be avoided. To postpone to 15 years the entry into industry is not, he says,

sentimental philanthropy but biologically well-founded economics. These are a few of the medico-biological considerations to be taken into account by legislators. There remains the recent sinister increase in juvenile accidents, which suggests that some cumulative strain is already in action, and the admitted strain which even normal hours of work may throw upon the young persons in occupations where there are loads to be lifted. And we are unaware of any systematic research to assess the effects of two- or three-shift systems upon the development of young people.

The positive evidence of the *good* effects of properly regulated employment for the age-group 16–18 should not be forgotten; and it is undoubtedly possible to combine wage-earning with education in a way that fulfils the chief needs of many boys and girls. The reports of the continuation schools at Rugby and York and Birmingham could be re-read with advantage. But it seems to us that anyone who employs young people must be able to show that the conditions are reasonable: and we should regard night-work as guilty until proved innocent rather than innocent till proved guilty. Whatever may be the economic pressure on juveniles for night-work, for overtime, or for two-shift systems, it must be resisted in view of the medical evidence—even if this does not amount to proof—that such kinds of work between the ages 16–18 are biologically unsound. They must be unsound, because they are likely to interfere with the normal processes of growth. Happily it is not for the medical profession to decide between the rival claims of economics and health; its task is to state the truth so far as it is able to do so, and on the evidence available to it. On this evidence, as it at present stands, overtime and night-work are not to be tolerated for adolescents, and we hope that Parliament may be persuaded to amend the present Bill so that, for those under 18 years old, the 48-hour week is exchanged for a maximum of 40 hours employment with 7–8 hours' education and recreation.

VASCULAR SPASM AND ASTHMA

THE distribution and function of the bronchial arteries has long been a matter of interest to Prof. I. DE BURGH DALY and his colleagues. They were led to its study in their search for the method of vascular adjustment in the lungs, the contractility or otherwise of the pulmonary arterioles and capillaries being in dispute. For practical reasons, indisputable information about the behaviour of the pulmonary vessels can be obtained only from a preparation of isolated lungs, and Prof. DALY felt that preparations of this sort in the past had perhaps lacked something vital in the shape of a blood-supply through the bronchial arteries. An analogy would be a preparation of the surviving heart in which a perfusion of the coronary circulation was omitted. Perfusion of the bronchial arteries as well as the pulmonary did, in fact, reopen the whole question of vascular control in the lungs. The pulmonary circulation was now found responsive to nerve stimulation, whereas before it had been inert. Vasoconstriction and vasodilatation were readily demonstrable. This was attributed to survival in the lungs of nerves which in previous experiments had quickly perished from ischæmia of the tissues in which they were embedded. Since histological and anatomical studies show that the bronchial vascular system supplies every tissue of the lungs except that part of the respiratory tract distal to the respiratory bronchioles, it may be assumed that this explanation is the true one. The correlation of an active pulmonary vascular bed with the rest of the circulation raises many problems and offers wide opportunities for speculation.[1]

Quite a different point, of immediate practical importance, has also been raised by Prof. DALY.[2] The bronchial arteries supply not only nerves but the bronchial muscles themselves. Interference with the circulation might therefore affect these directly or indirectly, and a new ætiological possibility is opened up with regard to asthma. Is asthma sometimes due to vascular spasm or disease? The answer to this question is not to be found in the laboratory. The most the physiologist can do is to demonstrate the effect on bronchial movement of interfering with the bronchial arteries, and so bring a prima-facie case. The final investigation must be made at the bedside and in the post-mortem room, and few will dispute the urgency of beginning this at once. Prof. DALY has pointed to the first path to be followed. "To us," he states, "it is becoming increasingly clear that . . . there should be a wider histological examination of the bronchial arteries in all pulmonary cases which come to post-mortem examination, for it is only by this means that we shall be able to obtain information as to whether the suggestive physiological experiments I have described are of significance in relation to the control of intrinsic mechanisms of the lungs during life." Those who doubt the significance of these experiments will realise the importance of justifying their scepticism by tangible evidence, and we commend the suggestion of examining bronchial arteries post mortem in pulmonary cases to the attention of morbid anatomists. Fortunately uncomplicated asthma rarely leads to death, but a good deal of relevant information must surely be obtainable from fatal cases where asthma has been part of the history.

INTESTINAL ADSORBENTS

IN the Far East kaolin or china-clay has probably been used for many centuries in the treatment of intestinal complaints. PÈRE DEUTRECOLLE, the Jesuit missionary to whom we owe much of our knowledge of the Chinese potter's technique in its later but still golden period, writing in 1712 mentions its employment for the relief of diarrhœa. Of late years it has been established in Western therapeutics, mainly on a basis that must be admitted to be highly speculative. That fuller's

[1] Harvey Lectures 1935-36, Baltimore, p. 235.
[2] *Trans. med.-chir. Soc. Edinb.*, 1936, p. 139. (*Edinb. med. J.*)

earth, kaolin, and other silicious earths are—to use the modern term—adsorbents may be looked upon as a very ancient discovery, since their properties as cleansing agents, and decolorisers, and even their capacity for taking glazes when baked, depend upon their adsorptive powers. But it is only with the growth of modern colloidal chemistry that the precise conditions under which adsorption operates have been defined. Kaolin, for example, which consists mainly of SiO_2, has powerful and very general adsorptive powers, particularly in an acid medium. (In alkaline media it is almost inactive and the elution of already adsorbed material may even be brought about by alkali.) It is argued that such a material taken by mouth should serve to remove "bacterial toxins" and other undesirable toxic matter from the intestinal canal; but if we stop to define the terms of the argument we find ourselves asking, What are the bacterial toxins in question? What part do they play in the production of disease? Do they in fact exist? To none of these questions has a satisfactory answer yet been given, and as Dr. E. S. EMERY of Boston says in his excellent review,[1] "the physician who uses adsorbents is entering a field of therapeutics in which the pitfalls are not clearly indicated and the usefulness of which has not been definitely defined."

Powerful adsorbents such as kaolin are double-edged weapons, and in our efforts to combat the still quite hypothetical condition of "alimentary toxæmia" we are introducing substances that almost certainly will exercise their adsorbent capacity indiscriminately on enzymes, mucus, foodstuffs, and vitamins, and so interfere in an unpredictable way with the delicate mechanisms of nutrition. Further we must remember that we are administering a material which ordinary sense suggests is unsuited to the digestive apparatus; it is abrasive and completely non-digestible, and it is capable of forming insoluble concretions in the body. It is possible moreover that it may be phagocytosed or otherwise lodged in the cells of the alimentary tubes. Be this as it may, EMERY points out that kaolin has not escaped criticism in actual therapeutic use. Intestinal irritation and inflammation, partial intestinal obstruction, and even perforation have been ascribed to kaolin treatment, and HOELZEL has reported the production of intestinal polyposes in rats by treatment with large doses. Even these considerations by no means exhaust the difficulties. Such precise knowledge as we have of the process of colloidal adsorption is based on the study of comparatively simple systems in vitro, and from this knowledge it would be impossible to predict what will happen in the complex and changing environment of the alimentary canal, where the hydrogen-ion concentration is variable, and where there are so many substances, useful and useless to the body competing for adsorption. There is the further difficulty that adsorbing agents can only be kept in a state of maximum activity under carefully arranged conditions; they readily adsorb gases, &c., and so have their adsorptive activity destroyed or impaired. One might ask, for example, how far their efficacy is affected by any liquid such as oil which may be used as a suspension medium.

The question of the action of adsorbents on the intestinal flora is an interesting one, and lends itself to precise study. BRAAFLADT in 1923 noted that kaolin will adsorb and inactivate large quantities of bacteria. Dr. W. SMITH, on p. 438, describes how he has investigated in vitro the action of adsorbents on the flora of the human fæces, and has found that kaolin and in particular kaolin-alumina mixtures, if given in adequate quantities, remove bacteria, including *Bacterium coli* almost entirely from suspensions of fæces, as judged by plate-counts of the fæces before and after adsorption. This is in itself an interesting observation, but it must be related to BRAAFLADT's statement that in the living human being kaolin treatment brings about a change from a proteolytic to an aciduric intestinal flora. Allowing that *Bact. coli* may be suppressed, or replaced by an acidophilic flora in the living subject, it by no means follows that any good has been done by the process. So far as we know we have lived on relatively good terms with our intestinal flora for countless generations and to any one impressed by the beautiful equilibria of the normal human body it would seem unwise to interfere with them without due forethought. That we are being constantly poisoned by our intestinal contents is one of those largely irrational beliefs that must have its roots deep in human nature. The address by Prof. WITTS at the front of our present issue is one that we are especially glad to publish because he is attacking one of the major errors of current practice.

[1] *J. Amer. med. Ass.* Jan. 16th, 1937, p. 202.

MINERVA

WE have before us [1] in one volume the directory of universities and professional schools in every part of the world, compiled by Dr. Gerhard Lüdtke with editorial guidance from Dr. F. Richter. For thirty editions this Yearbook of the Learned World contained within the same cover not only this information, but similar details of research institutes, observatories, libraries, archives, museums, and much else. Running, as it did, to 4345 pages, it had to be bound in three volumes, with consequent loss of some of its time-honoured ease of reference. The editors of Minerva then decided to carry through the cleavage, with the result that the more mobile part of the learned world has its own section which has been kept up to date and reissued at short intervals. That is a great convenience for all who have occasion to identify the position of some member of a teaching school in a university or medical school however remote. There is rather a disturbing doubt expressed in the preface whether it is physically possible to bring together and to revise such widespread material; but it has been done, and its success is a testimony to the publisher's love of science in general and of this task in particular. We are glad to recognise the public spirit of those who have again produced such a worthy book.

[1] Minerva: Jahrbuch der Gelehrten Welt. 32nd edition. Section: Universities and High Schools. Berlin and Leipzig: Walter de Gruyter and Co. 1936. Pp. 2201. RM.48.

ANNOTATIONS

AN ELECTRON MICROSCOPE

THE term "electron microscope" is used to describe an instrument in which a cathode beam is utilised as the source of energy, much as light is used in the ordinary microscope. There is this important difference that whereas ordinary light can be refracted and an image be formed of an object by a lens or a system of lenses, cathode rays cannot be so refracted. What corresponds to a lens system in the electron microscope is a magnetic field by means of which cathode rays may be focused and an image obtained of a suitable object on a fluorescent screen or photographic plate. The pioneers in the construction of instruments of this kind were Knoll and Ruska in Germany, who utilised methods already in use for cathode-rays oscillography. In the January number of the *Journal of Scientific Instruments* a new electron microscope is described. It has been made by Metropolitan-Vickers Electrical Co., Ltd., in collaboration with the optical department of the Imperial College of Science. As a beam of electrons may be regarded as light of very short wave-length, and as resolution in the microscope is mainly dependent on the wave-length of the light used, it follows that the efficiency of such an instrument is theoretically in proportion to the increased frequency of the radiation used. In the instrument here referred to this would mean that the possible optical limit might be as much as 1000 times greater than with any microscope using visual light. The application of this method to any problem in medical research may be remote. There is much still to be done on the physical side and, as in all advances in microscopy, a new technique will have to be developed in the preparation of material to enable even preliminary experiments to be conducted with any promise of success. How important this factor may be is perhaps indicated by the progress made in using ultra-violet light in microscopy. Objectives for using some wave-lengths in the ultra-violet region have been in existence for at least thirty years, but it is only comparatively recently that their use in biological problems has been fully exploited. Even now the complete utilisation of that part of the ultra-violet spectrum which is transmitted through air has not been achieved. The electron microscope is an interesting development in physical method, and its future will be watched by all those interested in any possible developments in microscopy. This at least can be visualised, that the microscope of the future will not be a bench tool; it will be an instrument of precision dependent for its development on the utilisation of radiation, using that term with its full physical meaning.

FLUID LOSS IN INTESTINAL OBSTRUCTION

AMONG the factors that have been blamed for the condition of shock associated with intestinal obstruction is diminution of effective circulating blood volume, due to fluid loss into the tissues and vessels of the obstructed loops. Ian Aird [1] has investigated this factor by experiments on cats, which include simple obstruction of the bowel lumen, obstruction combined with distension of the gut, and venous strangulation. The gain in fluid by the obstructed intestine was measured by comparison of its weight with that of an equal length of normal intestine; Aird concludes from the results that only in venous strangulation of considerable lengths of intestine is the diminution of the volume of circulating blood sufficient to be dangerous to life. A massive strangulation is found clinically in volvulus (particularly in the extensive volvulus of the new-born child which is associated with abnormal fixation of the intestine) and in thrombosis of the mesenteric trunks. Simple obstruction by ligature or closed-loop occlusion (double ligature) caused losses of fluid that were on the whole insignificant. Comparison of a piece of intestine twelve inches in length, excised immediately above an occlusion, with the twelve inches taken from immediately below showed that the gain in weight of the former did not amount to more than 5½ per cent. of the total blood volume. In a loop of intestine isolated by double ligature the gain in weight was 11 per cent. The effect of distending the isolated loop with air is to cause pronounced congestion, and the accumulation of blood and œdema fluid is much greater than in simple obstruction. In experiments involving one-half of the small intestine the gain in weight represented one-third of the volume of the circulating blood. Strangulation was studied by inserting a loop of gut into a rubber bag and tying a ligature round the neck of the bag till the mesenteric pulsation was just palpable. The blood entering the loop has no exit by the obstructed veins. Fluid accumulates in the wall of the gut and is poured out into the bag. A lateral anastomosis was formed outside the bag between the entering and returning loops. One-third or more of the blood volume can be lost by strangulation of lengths representing a third or more of the small intestine. It has been calculated that the maximum volume of blood that can be thus shunted into the vascular bed and wall of the intestine in gross congestion and distension of the intestine is in the region of 50 to 80 per cent. It is obvious that such a result of massive strangulation is sufficient to account for death without the intervention of other factors such as toxæmia and nervous stimulation which operate in less extensive lesions.

[1] *Edinb. med. J.* January, 1937, p. 28.

RIGHT-SIDED AORTIC ARCH

ONE result of abnormal development of the aorta is the rare right-sided arch, which curves over the right lung root and passes backwards to the right of the trachea and œsophagus instead of to the left, and then usually crosses to the left behind the œsophagus. During life the condition can only be recognised radiographically, and Dr. Evan Bedford and Dr. John Parkinson are able to give an account [1] of it illustrated by beautifully clear radiograms. Two main types have been differentiated according to whether the left subclavian artery passes in front of or behind the œsophagus after arising from the aortic arch, and they give characteristic pictures. In the anteroposterior view the ascending aorta is abnormally prominent though of varying outline, while there is an absence of the usual knob on the left; the barium swallow shows the œsophagus to be indented on the right instead of on the left. In the first oblique (right anterior oblique) position the picture is usually distinctive, the œsophagus being acutely dislocated forwards by the aortic arch, though this change may not be apparent in the first type. The descending aorta is sometimes visible on the right of the cardiac shadow, and it

[1] *Brit. J. Radiol.* December, 1936, p. 776.

may be tortuous. Other congenital defects—especially Fallot's tetralogy—are often associated with a right-sided arch, and the appearances peculiar to them will then be added. The symptoms, which are not constant, are the result of local pressure, and are likely to lead to suspicion of growth, intrathoracic goitre, or aneurysm. Bedford and Parkinson's study is based on 11 cases and attention to the points they raise should lead to correct diagnosis of this interesting congenital anomaly.

THE ROUTE OF INFECTION IN POLIOMYELITIS

MOST authorities hold that the portal of infection in poliomyelitis is the nasopharynx—at any rate in the great majority of cases—and that the virus reaches the central nervous system by passing along the olfactory nerves, after which its spread to the cord is axonal. Briefly stated, the evidence in support of this conception is as follows. The virus of poliomyelitis is highly neurotropic; nerve-cells are essential for its multiplication. In poliomyelitis the virus is found in the nasopharynx and in the central nervous system; it does not appear in demonstrable quantity either in the blood or in the cerebro-spinal fluid. If monkeys are infected by the cerebral route and the course taken by the virus in its spread thence to the anterior horn cells is followed, as Fairbrother and Hurst [1] and Faber and Gebhardt [2] have followed it, the evidence obtained suggests axonal spread. And lastly if the olfactory bulbs are destroyed then, as Schultz [3] has shown, the monkey becomes insusceptible to infection by the nasal route. Recent work by A. B. Sabin and P. K. Olitsky [4] provides an important addition to this evidence. They argued that if the virus reached the central nervous system by way of the olfactory nerves one might expect the olfactory bulbs to be the seat of early and constant change, and they carried out experiments to see if this was so. Working with the M.V. strain of virus and having ascertained the dosage necessary regularly to infect monkeys via the nose, they studied the olfactory bulbs in animals so inoculated. The first rise of temperature in their infected monkeys occurred 4–6 days after inoculation, paralysis appearing in another three days. In monkeys killed and examined on the fourth day the outer layers of the olfactory bulbs showed diffuse infiltration with polymorphonuclear leucocytes, mononuclear cells, and lymphocytes, and the mitral cells were frequently necrotic. At this time lesions were present in the mesencephalon and pons but were absent from the cord. Later when paralysis had supervened the changes in the olfactory bulbs were more conspicuous and well-developed cuffing of the vessels was observed. Lesions of varying extent were found in the olfactory bulbs in every one of 18 monkeys infected by the nasal route. They were absent in 13 monkeys infected by other routes, such as the cerebral, subcutaneous, ocular, or sciatic. It is noteworthy that Sabin and Olitsky only found lesions in the olfactory bulbs in one of three monkeys infected by intravenous injection. Lennette and Hudson [5] produced evidence that destruction of the olfactory bulbs protects the monkey against infection with poliomyelitis virus given intravenously. They thought that virus introduced into the circulation reached the central nervous system by being excreted on to the nasopharyngeal mucosa and then passing inwards along the olfactory nerves, but the experiments of Sabin and Olitsky seem to show that this is not always so. The work of Sabin and Olitsky does not merely give additional support to the theory of axonal spread; it goes some way to answer the question of the importance of the nasopharynx as the portal of infection in human poliomyelitis. If experimental poliomyelitis in the monkey is comparable to the human disease, then a study of the olfactory bulbs should tell us how often the virus enters the body by the nasopharyngeal route. Apparently there are very few observations on the incidence of lesions in the olfactory bulbs in poliomyelitis, and this gap in our knowledge will surely be rectified at the first opportunity.

[1] Fairbrother, R. W., and Hurst, E. W. (1930) *J. Path. Bact.* **33**, 17.
[2] Faber, H. K., and Gebhardt, L. P. (1933) *J. exp. Med.* **57**, 933.
[3] Schultz, E. W., and Gebhardt, L. P. (1934) *Proc. Soc. exp. Biol., N.Y.* **31**, 728.
[4] Sabin, A. B., and Olitsky, P. K. (1937) *J. Amer. med. Ass.* **108**, 21.
[5] Lennette, E. H., and Hudson, N. P. (1935) *Proc. Soc. exp. Biol., N.Y.* **32**, 1444.

BASOPHIL CARCINOMA OF THE PITUITARY GLAND WITH CUSHING'S SYNDROME

ALTHOUGH primary tumours of the anterior lobe of the pituitary gland often invade surrounding structures they very rarely give rise to metastases to remoter parts. Prof. Cohen and Prof. Dible [1] now report a case of Cushing's syndrome in association with a metastasising basophil carcinoma, and this is probably the first of its kind to be recorded. The patient was an unmarried woman of 50 and the clinical disturbance referable to the pituitary tumour began seven years before death. Examination about eighteen months before death revealed the characteristic clinical features of the syndrome. According to the authors all features were present except polycythæmia; but analysis of previously recorded cases shows that this is a questionable element of Cushing's syndrome. Of the other characteristic features all but amenorrhœa and obesity seem to have been clearly established. Amenorrhœa in a woman of 48, even though unattended by any conspicuous menopausal symptoms, is of course of doubtful significance; the obesity seems to have been transient. Biological examination of the urine for sex hormones yielded completely negative results. Treatment of the pituitary region with X rays was followed by an improvement which lasted for a little over a year, but relapse then rapidly led to death. At necropsy the pituitary gland was greatly expanded by a lobulated basophilic tumour of the anterior lobe. Cohen and Dible's statement that the hyaline change described by Crooke in the cytoplasm of the basophil cells was not found in their case is not, as might at first appear, a refutation of Crooke's observation. Their description is confined to the tumour cells; they do not describe the appearances of the basophil cells in such remnants of the anterior lobe as may have been present in their preparations. According to Crooke [2] this change is always found in the basophil cells of the anterior lobe proper and only occasionally in the cells of any tumour. In this connexion it is noteworthy that Rasmussen [3] has lately confirmed the presence of this hyaline change in three additional cases of Cushing's syndrome. The first was in a woman aged 27 who had a large, not definitely basophilic, tumour of the anterior lobe. The second, in a woman aged 44, is remarkable in that no tumour was found either in the pituitary or suprarenal bodies; there was no hyperplasia of the suprarenal cortex. The

[1] Cohen, H., and Dible, J. H. (1936) *Brain*, **59**, 395.
[2] Crooke, A. C. (1935) *J. Path. Bact.* **41**, 339.
[3] Rasmussen, A. T. (1936) *Endocrinology*, **20**, 673.

third, in a boy of 13, was associated with a suprarenal carcinoma which had metastasised to the lymph nodes and liver. Rasmussen also confirms the extreme rarity of these hyaline changes both in normal glands and in glands from patients with hypertension.

HISTAMINE AGAIN

On the assumption that histamine may be responsible for the increased permeability of the vascular bed in congestive cardiac failure, G. S. Barsoum and Prof. F. H. Smirk [1] using the method of Barsoum and Gaddum [2] estimated the quantity of "histamine-yielding substance" or H.Y.S. in the blood of normals and of patients suffering from this type of heart failure. They present the following evidence that H.Y.S. is identical with histamine.

(1) H.Y.S., like histamine, is inactivated by histaminase.
(2) H.Y.S. fails to cause a contraction of isolated guinea-pig's ileum which has previously been desensitised to histamine (but not to other materials which can cause its contraction) by exposure to a high concentration of histamine. Similarly, the H.Y.S. will desensitise the guinea-pig's ileum to histamine.
(3) Equal doses of histamine and H.Y.S. will cause equal contractions of isolated guinea-pig's ileum and equal falls of blood pressure in anæsthetised dogs.

They found that the H.Y.S. in the whole blood of eight normal humans varied between 0·05 and 0·11 γ per c.cm. with an average of 0·08. In congestive cardiac failure this amount was increased to 0·08–0·30 with an average of 0·25 γ per c.cm.—a concentration sufficient to cause flushing of the skin, reduction of blood pressure, and histamine headache in normal people. By separating the cells and plasma immediately after bleeding the patients, they found that in twelve normals the plasma H.Y.S. averaged about 0·008 γ per c.cm., while the red cell H.Y.S. averaged 0·15. In fourteen patients with congestive cardiac failure the plasma H.Y.S. and the H.Y.S. of œdema fluid were normal, but the red cell H.Y.S. averaged 0·46 γ per c.cm., varying between 0·08 and 1·00. The H.Y.S. in the cells is inactive until liberated by laking; for unlaked rabbit's cells, which are rich in H.Y.S., had no action on injection into a cat, whereas an equal quantity of laked cells produced a substantial fall of blood pressure. This explains why the raising of the *whole-blood* H.Y.S. found in heart failure does not cause symptoms. The investigators conclude that it does not account for the increased vascular permeability.

In a further communication [3] Barsoum and Smirk demonstrate an increase in the H.Y.S. content of the venous plasma during the phase of reactive hyperæmia following stoppage of the circulation of the arm for 10–30 minutes. An increase in the H.Y.S. of the red cells under these conditions is also demonstrated. In contrast with these results, Barsoum and Prof. J. H. Gaddum [4] give as normal *blood* histamine, using their method, a range of 0·027–0·05 γ per c.cm. in five subjects with an average of 0·035—substantially less than the results obtained by Barsoum and Smirk using the same method. On the assumption that histamine shock and the shock due to burns are similar, and ignoring the possibility that any increase in the blood histamine may be due to an increase in the concentration of the red cells in the blood, they give results for nine patients with burns which they summarise in the statement that "extensive cutaneous burns cause in man a large rise of blood histamine at about the time when secondary shock is liable to develop." This statement suggests that there may be some relation between the shock and the blood-histamine level. Their maximum figures for whole blood in five cases described were 0·12, 0·16, 0·20, 0·22 and 0·08, and 0·04 in a sixth patient who did not live long enough to achieve a raised blood histamine. Did she die of shock? Their figures are not as high as those obtained for whole blood by Barsoum and Smirk using the same method in cases of congestive cardiac failure, which results were due solely to excess of H.Y.S. in the cells. When the great increase of red cells in the blood in burns and the fact that intracellular H.Y.S. has no effect are taken into account, the figures given in this paper become even less significant. Further, the authors did not note flushing of the face or other signs of the presence of histamine in the circulation, and it is doubtful whether anyone has done so in cases of burns. The distribution of histamine between cells and plasma in such cases must be shown before the conclusion reached can be maintained.

[1] *Clin. Sci.* 1936, **2**, 337.
[2] *J. Physiol.* 1935, **85**, 1.
[3] *Clin. Sci.* 1936, **2**, 353.
[4] *Ibid*, p. 357.

HOOKWORM ANÆMIA

Anæmia is a symptom and not a disease. And in a review of present knowledge of the causes and treatment of hookworm anæmia Colonel Clayton Lane [1] points out the importance of remembering that cure of a symptom does not necessarily remove its cause. In order to understand this particular disease he thinks it essential to go back to first principles and he begins his paper with a discussion of the erythron and hæmopoiesis. It is therefore perhaps surprising that he accepts without question Sabin's theory of red-cell development. The normal hæmoglobin level, he agrees, is a controversial matter but believes it essential to recognise that 100 per cent. on the Haldane scale should be regarded as a minimum figure for health and that optimum figures should be higher. The purpose of treatment in hookworm anæmia should be to raise the hæmoglobin not merely to 80 per cent., which has been accepted as the criterion of cure, but above 100 per cent. The extensive studies of Rhoads and others [2] are inconclusive because in the first place they accepted a relatively low level of hæmoglobin as normal, and secondly because they were satisfied with what Colonel Clayton Lane believes to be unreliable methods of testing for the presence of parasites and of removing them when found. Their contention, therefore, that it is possible, by treatment with iron alone, to cure hookworm anæmia without disinfestation he regards as non-proven. He has found no case recorded in which the hæmoglobin level reached 100 per cent. Haldane or its equivalent while the patient was still infested. Treatment should first remove the worms, and secondly, supply adequate iron. He makes a plea for a determined and immediate effort to discover what anthelmintic, new or old, is the best and safest, since under present living conditions unworming is the only way of preventing infection and curing anæmia in hundreds of millions of people. Even if the anæmia is to some extent relieved by giving iron without removal of the worms the patient is still a dangerous source of infection to the community.

Colonel Clayton Lane's stimulating view is set out in basic English and those who read it will find that

[1] *Trop. Dis. Bull.* 1937, **34**, 1.
[2] Rhoads, C. P., Castle, W. B., Payne, G. C., and Lawson, H. A. 1931), *Medicine, Baltimore*, **13**, 317.

the use of a vocabulary of only 850 words—apart from technical terms—lends itself to incisiveness and simplicity.

UTERINE CONTRACTIONS

ALL too little is known about the factors governing the contractions of the uterus—a subject of great practical importance. Knaus in 1927 published observations on the influence of the corpus luteum, and since then a good deal has been found out about the nature of spontaneous uterine activity, and the type of response of the muscle to chemical, hormonic, and physical stimuli. This varies, as is now well known, with the species of animal, the phase of sex cycle, pregnancy, and the stage of pregnancy. Knaus and others believed that spontaneous contractions, and the reaction of the muscle to posterior pituitary extract, are most noticeable about the time of full development of the follicles in the ovary, when the secretion of œstrin is high, and least during the dominance of the corpus luteum. The latter observation has been confirmed by several workers, but is disputed by others; for Schultze, Moir, Tachezy, and now E. M. Robertson [1] have been unable to demonstrate an altered activity in the response of the uterine muscle to posterior pituitary extract during the luteal phase of the ovarian cycle. Robertson's observations were made with the use of a minute rubber balloon, inserted into the (non-pregnant) uterus, filled with fluid, and connected to a manometer. Twenty records were made in some twelve women, and several examples of tracings are reproduced in his paper. The experiments seem to demonstrate clearly the activity of the muscle and the existence of a response to posterior pituitary extract, while the uterus is under the influence of an active corpus luteum. Such findings throw doubt on the advisability of using preparations of progestin (the corpus luteum hormone) to discourage uterine contractions in a case of threatened abortion. But clinicians are persuaded that its use for this purpose is effective, and it is possible that during pregnancy progestin may have a desensitising action not apparent at other times.

JOHN HUNTER AS A MILITARY SURGEON

IN 1762, towards the end of the Seven Years War, our ancient ally Portugal was invaded by Spain and appealed for help, with the result that a British expeditionary force under John Campbell, fourth Earl of Loudoun, was sent to assist the Portuguese army. The Earl had seen service previously in the '45 and in North America: he was an indefatigable worker who also kept his papers, and as commander-in-chief he then had charge of the medical service as well as of the fighting. Three hundred documents from his collection were acquired in 1934 by the Royal College of Surgeons on the recommendation of the honorary librarian, Sir D'Arcy Power, and they have now been investigated by Prof. George Gask who described their contents in a special lecture given at the College on Monday last. The papers are of much interest not only because of the light they throw on the conditions and equipment of the army medical service of the time, but also because John Hunter served in this expedition as a military surgeon.

When John Hunter first came to London at the age of twenty he joined his brother William, but after ten years with him he contracted a pulmonary affection that it was feared might develop into tuberculosis unless he had a change. Accordingly in 1760 he obtained a commission as an army surgeon from the adjutant-general, Robert Adair—the original of the well-known song "Robin Adair"—and was sent to Belle Isle, off the coast of Brittany, which was taken from the French in 1761. When in the following year Portugal was invaded by Spain, four regiments of infantry and detachments of the 16th Light Dragoons were sent on from Belle Isle to Portugal where they were joined by two more regiments from Ireland, bringing the total of this B.E.F. to about seven thousand men. The commander-in-chief of the allied forces was the Count of Lippe Bückenberg, the famous artillerist, and he seems to have succeeded in holding the Spanish invasion not by attack but by laying waste the country in front of the enemy, and by defending the line of the Tagus so as to cover Lisbon. The hospitals with which Hunter was concerned were thus situated all along this river. The military operations were so trifling that some historians ignore them altogether. In the returns of the sick there is no mention of a wound, and as a rule no diagnosis. From one paper, however, it seems that the chief complaints were fever, ague, and flux; these, as Prof. Gask remarked, are the age-long complaints of the army. One of the most interesting of the papers is a list of the officers of the hospital appointed for the use of this force, giving the rates of pay per diem. The director, William Young, received 25*s.* a day. Two physicians, Dr. William Cadogan (whose portrait hangs on the stairs of the Royal College of Physicians) and Dr. Michael Merris, got £1 each. The surgeons, John Hunter, Francis Tomkins, and William Maddox, had to be content with 10*s.*, and likewise the two apothecaries. Finally came the surgeon's mates at 5*s.* a day each. There were 18 of them and although Prof. Gask did not say so one suspects that they did most of the work. But there was also a female staff attached to the hospital consisting of a matron who received 2*s.* 6*d.* a day, two head nurses and five washerwomen at 1*s.*, and sixteen nurses at 6*d.* Prof. Gask endorsed the value of the washerwomen from his own war experience. There is a difference of opinion about the status of the nurses, some holding that they were selected from the camp-followers, but Prof. Gask gave reasons for believing that they had had some hospital training. The orders for the discipline of the hospital show that this was under the control of the combatant side and that the duties were not unlike those of the modern military police.

As regards John Hunter, there are a number of official returns signed by him, one of which is a list of the sick on board the hospital ship *Betty* while bound from Belle Isle to Lisbon. He seems to have tried to secure the post of deputy-director of the hospital but without success, and when Dr. Cadogan was invalided home Hunter actually applied for the post of physician, but again without getting it. Probably the increased income was his chief object. He seems to have been in close touch with Lord Loudoun and to have discharged his duties often in difficult circumstances with the vigour and efficiency that all familiar with his character would expect. Transport appears to have been a constant trouble, for ambulances had not been invented and country carts had to be used unless the journey could be made by boat. When Hunter joined the troops at Belle Isle he described his colleagues in a letter home as "a dammed disagreeable lot," but the accusation of Jesse Foot that Hunter was quarrelsome on this expedition is not borne out by these Loudoun papers. On the other hand, they prove that the chief authority

[1] *Edinb. Med. J.* January, 1937, p. 20.

that Foot gives for his statement had a vile temper himself, so that his evidence is worthless. Prof. Gask's lecture will be published in full in the *British Journal of Surgery*.

THE EHLERS-DANLOS SYNDROME

IN the December issue of the *British Journal of Dermatology and Syphilis* Dr. F. Parkes Weber writes of one of the rarest of cutaneous congenital abnormalities, only 8 cases of which have so far been recorded in this country. Three features are essential for the diagnosis of the Ehlers-Danlos syndrome: (1) over-elasticity of the skin, which may be limited to certain areas, such as the knees and elbows, or may be more or less general; (2) over-extensibility of joints, especially the metacarpo-phalangeal of the thumb; and (3) friability or fragility of the skin and its blood-vessels, which must not be confused with epidermolysis bullosa as regards the former, or the dangerous hæmorrhagic tendency of the congenital "bleeder" as regards the latter. Dr. Parkes Weber regards the third feature as the most important, and it should not be ignored in the future recording of cases of "elastic skin" and "double-jointed" freaks—an occasional attraction in sideshows and travelling circuses.

GAS-PROOF ROOMS

THE air-raid precautions department of the Home Office recommend that "in each house a room or rooms should be prepared to prevent the entry of gas, so that it may be safely occupied during a raid in which gas is used." The Cambridge Scientists' Anti-War Group has been making experiments to discover whether rooms prepared according to the official instructions are really gas-proof. They find [1] that such rooms are in fact so leaky that—

> "if the gas outside is strong enough to injure a man fatally in one hour, then he will receive an equal dose in two and a half to four hours in his 'gas-proof' room. If the gas is much stronger outside and would kill in five minutes, then the survival time in the room would be only half an hour to an hour inside. These calculations are made on the assumption that the concentration of the gas remained constant, as it would do if a persistent gas were sprayed down the street."

After pointing out that in working-class homes a gas-proof room could seldom be provided, they describe experiments showing that gas-masks have only a limited value and express doubts about the possibility of protecting young children. Finally they comment on the catastrophic results to be expected from attacks on congested areas using gas, incendiary bombs, and high explosives, and illustrate their thesis with accounts of some (not very impressive) tests with the only form of thermite they could obtain. To those familiar with what has already been written on the subject their book contains few surprises, but it will no doubt destroy any undue confidence that may be felt in the efficacy of domestic gas-proofing. The object of the Government is to prepare people's minds against air-attack so that if this comes the public will do its best to avoid asphyxiation and (believing in the measures suggested) will refrain from losing its head. The object of the Cambridge Scientists' Anti-War Group, on the other hand, is to declare in advance that these measures are of little value and thus frighten the public into considering means of *preventing* war. Their book does much to counter optimism about safety against attack, and we agree with them that the facts, however unpleasant, should be faced. But the ordinary man is going to say, with some reason, that if it comes to air-raids he will certainly accept a Government gas-mask, and remain in a gas-proofed room—however leaky both may be—rather than be altogether unprotected.

[1] Protection of the Public from Aerial Attack. Being a critical examination of the recommendations put forward by the air-raid precautions department of the Home Office. By the Cambridge Scientists' Anti-War Group. (Editorial committee: J. D. Bernal, M.A.; Prof. H. A. Harris, M.B.; A. F. W. Hughes, Ph.D.; Joseph Needham, Sc.D.; N. W. Pirie, Ph.D.; J. S. Turner, Ph.D.; D. H. Valentine, M.A.; E. B. Verney, F.R.C.P., F.R.S.; C. H. Waddington, M.A.; Arthur Walton, Ph.D.; and W. A. Wooster, Ph.D.) London: Victor Gollancz Ltd. 1937. Pp. 127. 2s. 6d.

INCIDENCE OF TUMOURS OF THE CENTRAL NERVOUS SYSTEM

IT is remarkably difficult to form an accurate estimate of the incidence of any one type, or group, of tumours when the study of such a type or group has become the subject of intense surgical specialisation. An obvious effect of such specialisation is the attraction of sufferers to centres where the prospects of treatment are best. In any general hospital the establishment of a clinic for a particular type of case will naturally result in a great increase of material of such a kind at that hospital, and conversely—a point that is frequently forgotten—in its diminution in neighbouring hospitals. In the recent analysis by J. H. Peers [1] of the tumours of the central nervous system examined at necropsy at the Boston City Hospital during the past 38 years it is perhaps surprising to find that 188 tumours only were found in a total of 5150 necropsies in which the head had been examined, as compared with 1270 tumours, both benign and malignant, in other sites. The period covered by this series is from January, 1896, to December, 1934. It would be instructive to know whether the advent of Dr. Harvey Cushing to the neighbouring Peter Bent Brigham Hospital had any appreciable effect upon the incidence of intracranial tumours at the Boston City Hospital. The impossibility, at the present time, of correlating the incidence of tumours of the central nervous system with that of tumours of other organs is due to the absence of any general survey comprising sufficiently large figures and free from disturbing factors of the kind indicated. It has been stated by Bailey and Cushing in their monograph (1926) that, next to the uterus, the brain is the most common site of tumours; their view however can hardly be regarded as unbiased.

Although in the Boston City Hospital series the number of cases in many groups is too small to be significant, it is of interest that in the glioma group the proportions of the different types conform to those of Cushing's much larger surgical series. It is not surprising that the metastatic tumours are proportionately more numerous than in Cushing's series, because recognised cases of this kind are less apt to be referred to a neurosurgical clinic.

Sir Henry Brackenbury has accepted an invitation to stand for the Combined English Universities seat in Parliament, rendered vacant by the death of Sir Reginald Craddock.

ON Feb. 25th, March 2nd and 4th, at 5 P.M., Dr. D. E. Denny-Brown will deliver the Goulstonian lectures to the Royal College of Physicians of London. He will speak on the nervous control of micturition and its disorders. The lectures will be given at the College, and members of the medical profession will be admitted on presentation of their card.

[1] *Amer. J. Path.* 1936, **12**, 911.

PRINCIPLES OF MEDICAL STATISTICS

VIII—FURTHER PROBLEMS OF SAMPLING: χ^2

In the previous section attention was devoted to the appropriate test of the "significance" between two proportions. Occasions frequently arise, however, when we need to compare the characteristics of more than two groups. For instance instead of comparing the proportion of vaccinated persons who are attacked with small-pox with the proportion of unvaccinated persons who are attacked, we wish to see whether the proportions attacked vary with the duration of time that has elapsed since vaccination. We shall then have a series of differences between groups to interpret. For the comparison of such distributions the χ^2 test has been developed (originally by Karl Pearson).

Interpretation of a Series of Proportions

The statistical procedure may best be discussed by means of a concrete example. Table VII shows the distribution of intelligence quotients in a group of nearly a thousand children and the number in each intelligence group that were clinically assessed as having normal or subnormal nutrition.

TABLE VII—*Intelligence and Nutritional State* *

—	Intelligence quotients—				
	Under 80 %.	80–89 %.	90–99 %.	100 % and over.	Total.
(i) Number of children with satisfactory nutrition ..	245	228	177	219	869
(ii) Number of children with unsatisfactory nutrition ..	31	27	13	10	81
(iii) Total number of children observed	276	255	190	229	950
(iv) Percentage in each intelligence group that had unsatisfactory nutrition..	11·2	10·6	6·8	4·4	8·5

* From the Relation between Health and Intelligence in School Children by N. J. England (1936) *J. Hyg., Camb.* **36**, 74.

The percentages in the last line of the table show that amongst the more intelligent children there were proportionately fewer instances of subnormal nutrition, and the regular progression of the percentages, from 11·2 to 4·4 as the intelligence quotient rises, suggests that this relationship is unlikely to have arisen merely by chance. It is clear, however, that if another sample of 950 children were taken at random from the same universe of children we should not necessarily find in the different intelligence groups exactly 11·2, 10·6, 6·8, and 4·4 per cent. with unsatisfactory nutrition. Each of these percentages is certain to vary from one sample to another, and the smaller the sample the more, as has been previously shown, they are likely to vary. The question at issue then becomes this: is it likely that the magnitude of the differences between these percentages, and also their orderly progression, could arise merely by chance in taking samples of the size given in line three? Is it likely, in other words, that if we had observed the whole universe of children from which the sample was taken the percentage with unsatisfactory nutrition would be just the same in each intelligence group? To answer that question the assumption is made that the percentage with unsatisfactory nutrition ought to be identical in each of these groups—i.e., that intelligence and nutrition are unrelated. We then seek to determine whether that assumption is a reasonable one by measuring whether the differences actually observed from the uniform figure might frequently or only infrequently arise by chance in taking samples of the recorded size. If we find that the departure from uniformity is of the order that might frequently arise by chance, then we must conclude that the varying percentage of children with unsatisfactory nutrition in the different intelligence groups *suggests* that intelligence and nutrition are associated, but that these differences are not more than might have arisen by chance and might vanish if we took another sample of children. We must, therefore, be cautious in drawing deductions from them. If, on the other hand, we find that the differences from our assumed uniformity are such as would only arise by chance very infrequently, then we may reject our original hypothesis that each of the groups ought to show the same percentage. For if that hypothesis were true an unlikely event has occurred, and it is reasonable to reject the unlikely event and say that we think the differences observed are real, in the sense that they would not be likely to disappear (though they might be modified or increased) if we took another sample of children of equal size.

THE TECHNIQUE INVOLVED

The statistical technique, therefore, involves—

(1) Calculating how many children in each intelligence group would fall in the satisfactory nutrition category, and how many in the unsatisfactory nutrition category, on the assumption that intelligence and nutrition are unrelated, so that the proportions in the nutrition categories ought to be the same in each group.

(2) Calculating the differences between these numbers expected on the hypothesis of no relationship and the numbers actually observed.

(3) Calculating whether these differences are of a magnitude likely or unlikely to be due to chance.

The first step is to determine what is the uniform percentage with unsatisfactory nutrition that we should expect to observe in each intelligence group if intelligence and nutrition are unassociated. Clearly that figure must be the percentage of malnourished children in the universe from which our sample was taken; that is the figure we should, apart from sampling errors, expect to obtain in each intelligence group, if this characteristic is not associated with nutrition. We do not know that figure but as an estimate of it we may take the proportion of malnourished children in our sample as a whole—namely, 8·5 per cent. Our assumption then is that the proportion of malnourished children ought to be 8·5 per cent. in each intelligence group. If that assumption is true should we be likely to observe, in a sample of the size given, percentages of 11·2, 10·6, 6·8, and 4·4 merely by chance? We must first calculate the number of children expected in each intelligence group on this hypothesis that 8·5 per cent. of them ought to have belonged to the malnourished category and 91·5 per cent. to the satisfactorily nourished category. These figures are given in italics in Table VIII, being calculated by simple proportion—e.g., there were 276 children whose intelligence quotient was below 80 per cent.; we expect 8·5 per cent. of these 276, or 23, to be malnourished and 91·5 per cent., or the remaining 253, to be satisfactorily nourished.

TABLE VIII—*Calculation of* χ^2

—	Intelligence quotients—				
	Under 80 %.	80–89 %.	90–99 %.	100 % and over.	Total.
(i) Observed number with satisfactory nutrition ..	245	228	177	219	869
(ii) Expected number on hypothesis that nutrition and intelligence are unrelated..	*253*	*233*	*174*	*209*	*869*
(iii) Difference, observed minus expected	−8	−5	+3	+10	..
(iv) (Difference)^2	64	25	9	100	..
(v) (Difference)^2 ÷ Expected number	0·25	0·11	0·05	0·48	..
(i) Observed number with unsatisfactory nutrition ..	31	27	13	10	81
(ii) Expected number on hypothesis that nutrition and intelligence are unrelated..	*23*	*22*	*16*	*20*	*81*
(iii) Difference, observed minus expected	+8	+5	−3	−10	..
(iv) (Difference)^2	64	25	9	100	..
(v) (Difference)^2 ÷ Expected number	2·78	1·14	0·56	5·00	..
Total—					
Observed..	276	255	190	229	950
Expected..	*276*	*255*	*190*	*229*	*950*

The next step is to calculate the differences between the observed and expected entries. These, given in the third line of each half of the table, show that there are in fact more children of low intelligence with subnormal nutrition than would be expected on our hypothesis of equality and fewer with subnormal nutrition in the higher intelligence groups than would be expected on that hypothesis—e.g., of children in the under 80 per cent. intelligence group 31 had unsatisfactory nutrition whereas we expected only 23; of children in the over 100 per cent. intelligence group there were only 10 with unsatisfactory nutrition whereas we expected 20. These differences if added together according to their sign must come to zero. To get rid of this difficulty of sign, and for mathematical reasons underlying the test, each difference is squared (as shown in line iv). Finally the following point must be observed. If the number expected in a group is, say, 75, and the number actually observed is 100, the difference of 25 is clearly a relatively large and important one, since it amounts to one-third of the expected number. On the other hand, if the number expected in the group is 750 and the number actually observed is 775, the difference of 25 is a relatively small and unimportant one, since it amounts to only 3·3 per cent. of the expected number. To assess the importance of the difference, its square is therefore divided by the number expected in that category (in the first case above this gives a value of $(25)^2/75$ or 8·3, in the second case $(25)^2/750$ or only 0·83). The sum of these values is known as χ^2. In this table it equals $0{\cdot}25 + 0{\cdot}11 + 0{\cdot}05 + 0{\cdot}48 + 2{\cdot}78 + 1{\cdot}14 + 0{\cdot}56 + 5{\cdot}00 = 10{\cdot}37$.

In other words χ^2 is equal to the sum of all the values of

$$\frac{(\text{Observed number} - \text{Expected number})^2}{\text{Expected number}}.$$

THE INTERPRETATION OF THE χ^2 VALUE

χ^2, it will be observed, will be zero if the observations and expectations are identical; in all other cases it must be a positive value, and the larger the relative differences between the observed and expected values the larger must the value of χ^2 be. Also the more sub-groups there are in the table the larger χ^2 may become, since each sub-group contributes a quota to the sum. Therefore in interpreting the value of χ^2 account must be taken both of the value itself and of the number of sub-groups contributing to it. In fact, although its mathematical foundation is complex, the interpretation of χ^2 is simple by means of published tables—e.g., Table III in Fisher's "Statistical Methods for Research Workers" (Sixth edition. Edinburgh and London: Oliver and Boyd. 1936. 15*s*.), of which an illustrative extract is given at the end of this article. These tables show whether the various differences found between the observed and expected values, as summed up in χ^2, are sufficiently large to be opposed to our hypothesis that there ought to be a uniform proportion of malnourished children in each intelligence group. For instance in the present example $\chi^2 = 10{\cdot}37$ and the number of independent sub-groups is 3 (this number will be referred to in a moment); for these values Fisher's table gives a probability of somewhat less than 0·02—see table below. (The exact probability can be obtained from larger tables but is not always important, the main question being whether this value of χ^2 is one which is likely or unlikely to have arisen by chance.) The meaning of this probability is as follows. If our hypothesis that we ought to have observed the *same* percentage of malnourished children in each of the intelligence groups is true—i.e., we are sampling a universe in which malnutrition and intelligence are not associated—then in the different intelligence groups of the size shown we might have reached merely by chance the differing malnourished proportions actually observed (or even larger differences from the uniformity expected) about once in fifty times (0·02 equals 2 in 100). In other words, if we had 50 separate samples of 950 children with this distribution of intelligence and ought to observe within each the same percentage of malnourished children in the intelligence groups, then in approximately only one of these 50 samples should we expect the actual proportions of malnourished children in the intelligence groups to differ between one another, by chance, by as much as (or more than) the proportions we have observed here. Once in fifty we may take to be an unlikely event and may therefore conclude that our original testing-hypothesis of equality is wrong, and that it is more likely that the intelligence groups really differ in the incidence of malnourishment. If on the other hand our χ^2 value had turned out to be 4·64, then the probability figure would have been 0·2. In other words, once in five trials we might reach differences of the observed magnitude between observation and expectation merely by chance. Once in five trials is a relatively frequent event, and we should have to conclude that the differences between the proportions of malnourished children in the intelligence groups might easily have arisen by chance, and we can draw from them no more than very tentative conclusions.

As with all tests of "significance" it must be observed that the final conclusion turns upon probabilities. There is no point at which we can say the differences could not have arisen by chance or that they must have arisen by chance. In the former case we say chance is an unlikely cause, in the latter that it could easily be the cause. It may not have been the cause in the latter—real differences may

exist—but our data are insufficient for us to rule out chance as a valid hypothesis.

HOW TO USE FISHER'S χ^2 TABLE

Finally we must consider the number of sub-groups, or "cells," in the table contributing to χ^2.

In Table VII (or VIII which shows the calculations on the data of Table VII) there are 8 such values contributing to the sum. In finding P, the probability, from Fisher's table we took the number, n, to be only 3. The rule to be followed in tables of the type taken above as an example is that n is the number of cells which can be filled up independently of the totals in the margins at the side and bottom of the table. In Table VII the expected numbers of malnourished children in three of the intelligence groups must be found, by simple proportion, by applying 8·5 per cent. to the total number of children in each of those three groups. Having found those three values all the other expected values can, however, be found by simple subtraction, since the total expected values vertically and horizontally must be the same as the observed values—e.g., having found the expected values of 23, 22, and 16=61 in three intelligence groups, the expected number in the fourth group must be 20, since the total must be 81 (8·5 per cent. of 229 is nearly 20). Similarly if 23 malnourished children are expected in the intelligence group of "under 80 per cent." then the well-nourished in that intelligence group must be 253, for the total children of that type is 276. Hence only 3 values in this table need to be found independently by applying proportions, and the remainder can be found by subtraction.

In any practical problem the number of expected values which need to be found independently by simple proportion can easily be ascertained on inspection of the table; alternatively they can be found by means of the rule $n=(c-1)(r-1)$, where c is the number of columns, excluding the "total" columns, and r the number of rows in the table—e.g., in Table VII, $n=(4-1)(2-1)=3$. It is with this n that Fisher's table must be consulted.

It may be pointed out that in the above example the expected numbers were taken to the nearest whole number for the sake of simplification, but it would have been more accurate to retain one decimal and in practice this should be done. A warning may be added that if the expected number in any cell is less than 5 the χ^2 value is liable to be exaggerated and the probability derived from it may be inaccurate. In such cases adjacent columns should, if possible, be amalgamated to give larger expected numbers.

The following table is a short extract, given for illustrative purposes, from Fisher's table. In the latter the χ^2 values are tabulated for each value of n from 1 to 30 and for 13 probability values.

Table of χ^2

n	P=0·90	0·70	0·50	0·20	0·05	0·02	0·01
1	0·0158	0·148	0·455	1·642	3·841	5·412	6·635
3	0·584	1·424	2·366	4·642	7·815	9·837	11·341
10	4·865	7·267	9·342	13·442	18·307	21·161	23·209
15	8·547	11·721	14·339	19·311	24·996	28·259	30·578

n is the number of cells that needed to be filled independently (as defined above) in the table of observations under study. In the centre of Fisher's table are set out the values of χ^2. At the top is the probability arising from the observed value of χ^2 for a given value of n. For instance, in the example taken above n was 3 and χ^2 was 10·37. Glancing along the χ^2 values against n=3, we see that a χ^2 of 9·837 gives a P, or probability, of 0·02 and one of 11·341 gives a P of 0·01. Our value of 10·37 must therefore give a P of somewhat less than 0·02. If on the other hand χ^2 had been 4·642 we see that the P against that value is only 0·2. If n had been 10 and the value of χ^2 found were 18·307, then P would be 0·05. As a conventional level a P of 0·05 is usually taken as "significant"—i.e., the proportions observed in the different groups under examination would only show by chance a departure from the assumed uniformity as great as (or greater than) that actually observed once in twenty times. But, as pointed out in the last section, the worker is entitled to take any level of "significance" he wishes so long as he makes his standard clear.

Summary

In practical statistics occasions constantly arise on which we wish to test whether persons who are characterised in some particular way are also differentiated in some second way—e.g., whether persons of different hair colour have also a different incidence of, say, tuberculosis. Suppose we take a random sample of the population, divide them into groups according to their hair colour, and then compute for each of these groups the percentage of persons with active tuberculosis. These percentages will probably not be identical even if hair colour and incidence of tuberculosis are *not* associated. Owing to chance they will vary between themselves. We need a measure to show whether such observed differences in incidence are in fact likely or unlikely to be the result of chance. To this type of problem the χ^2 test is applicable.

A. B. H.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 6TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1666; diphtheria, 1253; enteric fever, 61; pneumonia (primary or influenzal), 3140; puerperal fever, 59; puerperal pyrexia, 148; cerebro-spinal fever, 37; acute poliomyelitis, 3; encephalitis lethargica, 6; dysentery, 30; ophthalmia neonatorum, 78. No case of cholera, plague, or typhus fever was notified during the week.

Notifications of acute pneumonia in England and Wales were 95 per cent. above expectation, in London itself 17 per cent. below.

The number of cases in the Infectious Hospitals of the London County Council on Feb. 12th was 3437, which included: Scarlet fever, 809; diphtheria, 1006; measles, 22; whooping-cough, 597; puerperal fever, 20 mothers (plus 12 babies); encephalitis lethargica, 284; poliomyelitis, 3. At St. Margaret's Hospital there were 17 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox, 4 (1) from enteric fever, 3 (0) from measles, 5 (1) from scarlet fever, 40 (4) from whooping-cough, 52 (5) from diphtheria, 37 (13) from diarrhœa and enteritis under two years, and 976 (101) from influenza. The figures in parentheses are those for London itself.

Of the 788 deaths from influenza in the great towns of England and Wales outside Greater London the largest totals were reported from Manchester 51, Birmingham 50, Sheffield 37, Liverpool 35, Leeds 20, Plymouth 15, Derby 12, Bristol 11, Ipswich 10. Of these only Birmingham, Sheffield, and Leeds showed a drop from the previous week. The corresponding figures for Scottish and Irish towns were Edinburgh 37, Glasgow 39, Dublin 43, Belfast 18.

Darlington reported 1 death from enteric fever, Liverpool the other 2. Bolton had 4 deaths from whooping-cough, Middlesbrough 3, Willesden, Wood Green, and Manchester each 2. Fatal cases of diphtheria were reported from 24 great towns, Birmingham 7, Liverpool 5, Hull and Manchester each 4, Swansea 3.

The number of stillbirths notified during the week was 292 (corresponding to a rate of 42 per thousand total births), including 39 in London.

SPECIAL ARTICLES

THE NEUTRALISING VALUE OF POLIOMYELITIS CONVALESCENT SERUM FROM THE 1934 EPIDEMIC IN DENMARK

BY G. HARDY EAGLES, M.D. Toronto, D.P.H.
MEMBER OF THE SCIENTIFIC STAFF, LISTER INSTITUTE OF PREVENTIVE MEDICINE, LONDON

CLAUS JENSEN, M.D.
DIRECTOR OF DEPARTMENT OF BIOLOGICAL STANDARDS, STATE SERUM INSTITUTE, COPENHAGEN; AND

E. JUEL HENNINGSEN, M.D.
EPIDEMIOLOGIST, STATE DEPARTMENT OF PUBLIC HEALTH, COPENHAGEN

DURING 1934 there was an extensive epidemic of poliomyelitis in Denmark. Aside from its magnitude this epidemic was of especial interest because during the latter half of the year nearly 4500 carefully diagnosed cases were taken into hospital, of which 4000 were in the early systemic phase of the disease. Unlike most epidemics elsewhere it occurred in a population where, owing to the long-standing and systematised methods of public health administration, the medical profession and the general population are amenable to centralised control and uniform policy. The value of this appeared in the ease with which convalescent serum was collected. A preliminary report on the epidemiology and clinical features of the outbreak, and the use of convalescent serum, has appeared elsewhere and may be consulted for details (Jensen 1935).

The 1934 epidemic followed a smaller one in the previous year, when some evidence of the value of convalescent serum was obtained although the supply was inadequate. It was anticipated that in the summer and autumn of 1935 there would be a third epidemic for which it was desirable to have on hand an adequate supply of suitable convalescent serum.

In almost all previous epidemics elsewhere serum has been taken from old paralytic cases of poliomyelitis with crippling evidence of the disease. These were doubtless selected because of the ease with which they could be traced and because the diagnosis was certain. It may, however, be questioned whether such donors are likely to yield sera with the highest possible content of protective antibody. It is well known that the capacity for antibody-production against specific antigenic stimuli varies immensely, and in poliomyelitis the paralytic cases may represent individuals with a low response. In virus infections the time-interval between infection and the peak of antibody-content in the serum appears to follow the same course as in most other infections. Brodie (1932a and b) has shown that in animals the response to an intradermal dose of poliomyelitis virus reaches a maximum within 20–30 days, and that after a second dose antibody forms rapidly with a maximum in 10–18 days. If the same is true of man it follows that serum must be collected much earlier than is usual if the greatest concentration of antiviral principles is to be obtained. In Denmark the selection of donors was made with this in mind.

The principal objectives in reinvestigating the protective power of convalescent serum were first, to use the opportunity here presented of testing pools of serum from selected donors in quantities sufficiently large to be of practical use in epidemics; and, secondly, to discover whether, by selection of donors at certain phases during convalescence, serum of higher potency might be obtained.

All the serum was taken from fresh cases representing three different clinical groups of patients—namely, (*a*) frankly paralytic cases, (*b*) non-paralytic cases, and (*c*) abortive cases. The "abortive" cases were those in which very slight and transitory symptoms appeared in persons who were in close relationship to unquestionable paralytic and non-paralytic cases in families or institutions. It has seemed reasonable to assume that in such cases the infection is abortive by reason of their greater capacity to resist an infective dose of virus and also to produce antiviral substance quickly. The interval between the onset of disease and bleeding was therefore shortest in these donors.

Serum was collected, stored in ampoules without preservative, and tested for sterility in Denmark. To avoid delay and possible deterioration sera were transported to England by air mail and kept in the cold-room during the test period. The selection of cases, the preparation of sera, and the entire epidemiological part of this investigation were carried out by C. J. and E. J. H., while the virus-neutralisation tests in monkeys were performed by G. H. E. in England.

PREPARATION OF "STANDARD" VIRUS FOR USE IN THE TESTS

The cervical and lumbar enlargements from twelve cords of monkeys which had recently been killed at the height of complete paralysis were stripped free of the meningeal covering and minced. This rather coarse mince was stored in 50 per cent. saline-glycerin at about −10° C. The preparation of minced material from several cords avoided the possibility of using sections of the same or different cords possessing varying concentrations of the virus. It also provided a sufficient amount of virus of about the same virulence to extend throughout the entire investigation. Since it is well known that virus-infected cords retain their virulence for many months when kept in glycerin at a temperature below freezing-point, this method served to provide a virus of uniform infectivity. The importance of using a uniformly infective dose of virus for comparative tests was clearly shown in the observation of Schultz and Gebhardt (1935b) that the incidence of serum-treated animals which escaped infection bore some relationship to the dose of virus with which the animals were inoculated. When 6·6 M.I.D. of virus were used a certain number of animals were protected by serum. With larger doses of virus the same serum prolonged the incubation period but none of the animals escaped infection.

When samples were required for neutralisation tests the mince was thoroughly stirred and approximately the required amount removed and washed in three changes of normal saline. The exact amount for the test was then weighed, ground with sand, diluted, and mixed thoroughly with sufficient normal saline to make a 10 per cent. suspension. The suspension was spun at 3000 to 4000 r.p.m. for fifteen minutes and the uppermost portion of the supernatant removed. When neutralisation or infectivity tests were to be made a fresh 10 per cent. suspension was made from the "standard" minced virus.

Titration of "Standard" Virus.—Decimal dilutions of the 10 per cent. virus supernatant were made in normal saline from 10^{-1} to 10^{-6}. These were incubated at 37° C. for 2 hours and allowed to stand in the cold-room overnight. 0·5 c.cm. of each dilution was inoculated intracerebrally into young rhesus monkeys under ether anæsthesia. Monkeys receiving dilutions 10^{-1}, 10^{-2}, 10^{-3} were all completely paralysed on the sixth day following

TABLE I—*Convalescent Serum Pools and Protective Titre*

—	Serum pool.	No. of cases in pool.	Special features.	Virus.	Dilution of serum giving complete protection.	Dilution of serum followed by complete paralysis.	Value in protective "units" per c.cm. serum.
GROUP I—FIRST BLEEDING.				M.P.D.			
(1) *Paralytic cases.* Average 29 days after onset of meningitic state.	A 253	67	..	1000	No protection undiluted.	..	< 1,000
	A 239	22	..	"	1 in 20	1 in 40	40,000
(2) *Non-paralytic cases.* Average 26 days after onset of meningitic state.	B 260	184	..	"	1 in 5	1 in 10	10,000
	BB 444	33	Blood group B.	"	1 in 75	1 in 100	150,000
	B 505	535	1st test.	"	1 in 40	1 in 50	80,000
			2nd "	"	1 in 20	1 in 40	40,000
(3) *Abortive cases.* Average 13 days after onset of meningitic state.	C 108	6	..	"	1 in 50	1 in 75	100,000
	C 354	20	..	"	1 in 5	1 in 10	10,000
	C 251	1	Single serum from C 354.	"	1 in 5	1 in 10	10,000
GROUP II—SECOND BLEEDING.							
(1) *Paralytic cases.* Approximately 4 months after onset of meningitic state.	A 604	48	Unconcentrated.	"	1 in 10	1 in 20	20,000
	A 604 concentrated.	..	Pseudoglobulin concentrated approx. 8 times.	"	1 in 50	1 in 75	100,000
			Euglobulin concentrated approx. 5 times.	"	No protection undiluted.	..	< 1,000
(2) *Non-paralytic cases.* Approximately 4 months after onset of meningitic state.	BB 500	48	Blood group B.	"	1 in 20	1 in 40	40,000
	B 501	34	Blood group A.	"	1 in 20	1 in 40	40,000
	B 502		Seitz filtered B 501.	"	1 in 20	1 in 40	40,000
	B 506		B 501 dried and reconstituted.	"	1 in 75	..	> 150,000
GROUP III—CONTROL SERA.							
(1) Normal adult sera pooled.	Lister.	23	..	"	1 in 50	1 in 75	100,000
(2) Claus Jensen.	..	1	Single serum from normal pool.	"	1 in 10	1 in 25	20,000
(3) Prague II.	..	..	Old convalescent.	"	1 in 25	1 in 50	50,000
(4) " 13.	..	..	" "	"	1 in 25	1 in 50	50,000
(5) Hyperimmune horse serum.	..	..	Lister Institute.	"	1 in 75	1 in 100	150,000

< = less than. > = more than.

inoculation and were killed. The remainder of the series showed no sign of paralysis. Sections from the nervous tissue of paralysed animals showed typical lesions.

Test Dose of Virus.—0·5 c.cm. of a 10^{-3} dilution of the virus was assumed for practical purposes to contain one minimal paralysing dose (M.P.D.). In order to allow for individual variation in susceptibility of monkeys to the virus 0·5 c.cm. of a 1 per cent. virus supernatant (1000 M.P.D.) was selected as the test dose for all neutralisation tests. Throughout the investigation this dose always caused complete paralysis within ten days in the control animals.

Serum-neutralisation Tests

In the first instance all sera were tested undiluted, diluted 1 in 10, and 1 in 20 in normal saline. Equal parts of 1 per cent. virus and the serum were mixed, incubated for 2 hours at 37° C., and stood in the cold-room over-night. A control of equal parts of virus and normal saline was included. Next morning 1 c.cm. of each virus-serum mixture was inoculated intracerebrally in young, healthy rhesus monkeys. A control monkey received at the same time 1 c.cm. of the virus-saline mixture. When all test animals remained unaffected for three weeks after inoculation fresh monkeys were inoculated with higher dilutions of each serum until an end-point of protection was reached and paralysis resulted. In all but one instance an initial paralysis progressed rapidly to the complete stage.

Results.—The dilutions of serum which afforded protection against 1000 M.P.D. of the virus are set out in Table I. It has been assumed for practical purposes in expressing values that twice the amount of serum actually used in the neutralisation tests would give twice as much protection. There is, however, no experimental proof that this is, in fact, true. The main object in adopting this scheme of expression has been to denote the values of the different sera in terms of a unit volume (1 c.cm.), since this might prove useful in future in the event of a standard convalescent human serum from poliomyelitis cases being set up and issued.

Discussion

From this investigation it is difficult to draw clear-cut conclusions in favour of the thesis upon which the work was largely based—namely, that sera taken early in convalescence from poliomyelitis have a significantly higher protective titre than those taken later. A source of error which might well make an appreciable difference in the protective value of the sera appears when the number of individual sera in each pool are compared. This would not be serious if it could be assumed on experimental evidence that each serum in any given pool possessed approximately equal protective value. But to make this assumption would not be justifiable in view of the results of other investigators. Shaughnessy, Harmon, and Gordon (1930a and b) found considerable variation in titre of individual convalescent sera, 3 of the 14 sera tests having failed to neutralise in any dilution. Schultz and Gebhardt (1931) and Jungeblut and Smith (1932) also obtained some negative results. In our own control group evidence of wide variation was suggested when one serum (Group III (2)) from a pool of normal individuals gave protection in a dilution of 1 in 10 whereas the pool itself protected in a dilution of 1 in 50. Under such circumstances the dilution factor must influence the titre of a pooled serum in direct ratio of the number of high titres to low in the mixture.

The single serum just mentioned is of interest in one more respect. It was obtained from a man (C. J.) who

for more than two months every day had been in close contact with numerous fresh cases of poliomyelitis in all phases of the disease. Yet it was relatively poor in viricidal antibodies (20,000 protective "units" per c.cm.).

It is well known that individual variation in susceptibility to the virus may be found in the same race of monkeys. Even when large enough doses of virus are used to ensure that all control animals become completely paralysed variations in protection appear in different monkeys with the same dilution of a serum. Two instances were found in our series: in the case of B 505 when a dilution of 1 in 40 gave complete protection to one monkey but not to a second one against the same dose of virus, the test being made on the same day; and again in the neutralisation tests with hyperimmune horse serum. Here on one occasion protection was obtained in dilutions 1 in 25 and 1 in 75 of the serum, but with 1 in 50 complete paralysis occurred on the eighth day. When the serum was retitrated complete protection was obtained with a 1 in 50 dilution. In both cases, however, a dilution of 1 in 100 failed to neutralise and it appeared reasonable to accept the end-point of protection as 1 in 75.

Since, with these exceptions, only one animal was used for each dilution throughout the series it is not possible to say how far such variation may have influenced our results. To this may possibly be attributed the fact that pool B 502 gave so much less protection than the same pool (B 506) when it had been dried and reconstituted. It is probably very unusual, however, for animals to vary so widely as this would suggest and some other explanation must be sought.

BLOOD GROUPS

The high protective value in Group I of pool BB 444, consisting of donors belonging to blood group B, recalls the work of Jungeblut and Smith (1932), who found that cases of poliomyelitis were fewer in members of this group; the sera of a greater proportion of normal persons neutralised in this than in other groups, and the pooled sera of this group neutralised in higher dilution than that of other groups. When convalescent sera were tested for neutralising power a higher percentage was obtained in those from Group B. In this connexion the observations of Madsen, Engle, C. Jensen, and Freuchen (1936) are of interest. With the clinical material in the epidemic in Denmark with which, for the greater part, the present investigation deals, they were unable to relate the blood group of the patients to susceptibility or resistance to the attack. In our series comparison of blood groups A and B can be made only in Group II (B 501 and BB 500) where no difference in neutralising power was found. It may be mentioned here that the only striking example of a higher titre in serum taken early in convalescence over that taken later is found in blood group B (BB 444 and BB 500).

In order to make this point clearer the data regarding protection by blood group have been recast in Table II.

TABLE II

Protective Power of Sera in Relation to Blood Group

Serum pool.	—	Blood group.	Virus.	Dil. of serum giving complete protection.	Dil. of serum followed by complete paralysis.	Value in protective "units" per c.cm. of serum.
BB 444	First bleeding.	B	M.P.D. 1000	1 in 75	1 in 100	150,000
BB 500	Second bleeding.	B	,,	1 in 20	1 in 40	40,000
B 501	Second bleeding.	A	,,	1 in 20	1 in 40	40,000

The full data as to number of individuals in the pools and time of bleeding appear in Table I.

THE BEST SOURCE OF CONVALESCENT SERUM

From our investigation, selected convalescent sera appear to have little advantage over serum from normal adults when the titre of the control pool is compared with the values obtained in the convalescent groups I and II. A strict parallel between normal serum and convalescent pools cannot, however, be made since only one sample of pooled normal serum was tested as compared with eleven from convalescents. The relatively high neutralising value of two pooled sera from convalescents of long standing compared favourably with many of the convalescent pools. This has been the experience of most other investigators who have worked along similar lines.

In a preliminary report it has been stated (Eagles, cited by C. Jensen, 1935) that the pooled sera from abortive and non-paralytic cases appeared to have higher neutralising value than from paralytic cases. At that time the investigation was incomplete; the results now available call for qualification of the earlier statement in that when a larger number of pools was examined both high and low neutralising titres occurred in the pools from all three types. Investigation on a larger scale might make this point clearer, especially in view of the fact that, on the whole, the neutralising values are higher than in the paralytic cases.

NEED FOR STANDARDS

In our experiments an attempt has been made to use a standardised technique in order to make the results comparable. We consider this important because the results of neutralisation tests in published data are often stated only vaguely, thus: "nine out of the nineteen sera neutralised the virus when the serum had been diluted 1 in 60," or "such sera regularly neutralised the virus emulsion when diluted 1 in 20, but did not neutralise in dilution 1 in 30." As the method of preparing the virus emulsion and the test dose used is not always given, it is obvious that such results are not comparable. If the possible effect of convalescent serum therapy is to be correctly evaluated, if the maximum of information is to be obtained from clinical trials, and if the results in different countries are to be rendered comparable, it is essential that all anti-poliomyelitis sera used experimentally and clinically should be tested *in relation to a common standard and their potency expressed in terms of this standard.* This has been emphasised by Th. Madsen and C. Jensen (1935), who have proposed an international standard for anti-poliomyelitis convalescent serum.

Even with the technique employed by us the results, for this reason, cannot be regarded as quite comparable. If future work of this kind were to be undertaken, it would therefore seem advisable to use, if possible, both the test virus and the proposed international standard serum preserved in the dried state. Furthermore, the testing of an unknown serum should always include a control series with the test dose of virus against varying amounts of the standard serum. These tests should be carried out simultaneously and under strictly comparable conditions, and, despite the expenditure incurred,

a sufficiently large number of animals for each dilution of the unknown serum and the standard serum to guard against variation in the susceptibility of an individual monkey to the serum-virus mixture.

IMMUNE HORSE SERUM

In the control group of sera a sample of hyperimmune horse serum prepared in the serum department of the Lister Institute has been included for comparison with our selected convalescent pools. It will be seen that pool BB 444 has equal neutralising value with the horse serum and C 108 has a value only slightly less. There is hesitation in using immune horse serum in the treatment of poliomyelitis. These results show that it is possible to secure large quantities of convalescent serum with a neutralising value which compares favourably with hyperimmune horse serum.

VALUE OF SERUM IN TREATMENT AND PROPHYLAXIS

The question naturally arises whether the possible value of serum therapy in combating poliomyelitis justifies further investigation. In the Danish as well as in other recorded epidemics the value of serum therapy has been questionable owing to the absence of an adequate control group. The large proportion of untreated cases that make an uneventful recovery confuses the issue still further. It is impossible to judge the value of serum in contacts since many, with or without serum, never contract the disease. It is as a prophylactic and in the preparalytic stage that serum may be of value if massive repeated doses of a tested highly neutralising serum are employed. Schultz and Gebhardt (1935a and b) have shown that in the experimental disease immune serum was of limited value as a prophylactic. The infecting dose of virus was important. Large amounts of high-titre immune serum might protect monkeys against small doses of virus. The effect of the serum was, apparently, to diminish the quantity of virus free to initiate infection, and the larger the initial dose of virus the less effective became the serum. It is probable that some such ratio between virus and antibody determines the outcome in serum-treated cases; while in the experimental disease, under such conditions, even small differences in susceptibility of the animals would become important. The great affinity of the virus for nervous tissue, the ease with which it passes along the olfactory nerve to the central nervous system, and its possible absence at all times from the blood stream may assure it a high degree of protection from serum antibodies once the disease is established. The present trend of preventive measures—at any rate in America—is towards the application of chemical substances to the nasal mucous membrane, to protect the endings of the olfactory nerve from invasion (Armstrong and Harrison 1935, Sabin, Olitsky, and Cox 1936, Schultz and Gebhardt 1936). But should such measures prove effective for routine prophylactic treatment, there will still remain a demand for serum, since no other form of specific treatment is at hand in combating the established disease.

That convalescent or other sera are of real value in human poliomyelitis is not proven. Almost uniformly, however, the clinical evidence points to an improvement in symptoms and general condition when convalescent serum is employed, and to disregard this fact would be unwarranted. Moreover, the behaviour of serum in the experimental disease cannot be used as a true index of its effects on the natural course of human poliomyelitis. Harmon and Harkins (1936) express the opinion, based upon an analysis by Harmon (1934) of 4400 patients treated with serum, that convalescent and other specific serum therapy should be continued. The serum used should be of the highest possible neutralising value as judged by animal tests. In a survey of the literature dealing with neutralising antibody in the blood of human convalescents Harmon (1936) draws attention to the high percentage (about 40) of cases in which neutralising antibody is absent. In normal persons the antibody content rises with advancing age, and the same survey shows that at fifteen years of age 73 per cent. have neutralising antibody. Since it is impracticable to test each serum separately and to pool only those of high value, full neutralisation tests should be carried out on serum pools that are intended for use in practice, if those of low titre are to be avoided. Pools of relatively low neutralising titre need not be discarded. Our results show that these may be fractionated, and, by concentration of the pseudoglobulin fraction, a serum of relatively high value be obtained (A 604, A 604 conc.).

SUMMARY

The protective value, as judged by neutralisation tests in monkeys, of human convalescent serum collected from the Danish epidemic of 1934 has been investigated. Separate pools were obtained from abortive, non-paralytic, and paralytic cases 13–29 days after the onset of the meningitic state and compared with similar pools collected about four months later. Some evidence has been obtained that pooled serum taken very early from non-paralytic and abortive cases may have higher neutralising value than from paralytic cases but this is not sufficiently definite to be convincing. Serum taken early in convalescence (13–29 days) does not seem to have any greater neutralising value than that taken later (4 months). Comparison with pooled normal serum and with serum from convalescents of long standing shows that these also contain viricidal antibodies in amounts not significantly less than those taken early in convalescence.

It is possible to collect pooled convalescent serum with a neutralising value as great as that obtained by immunising horses.

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KING'S COLLEGE HOSPITAL.—Lord Wakefield will preside over the annual court of this hospital which will be held on Tuesday, Feb. 23rd, at 5 P.M. It will be followed by the opening of a new wing for private patients which has been given by friends of the hospital on the Stock Exchange.

MEDICINE AND THE LAW

Perils of the Paddling-Pool

LAST August a boy entered a paddling-pool in Bishop's Park, an attraction furnished by the Fulham borough council to simulate the seaside. The pool was nowhere more than 2 feet deep. The boy felt his foot make contact with something sharp; on coming out of the water he found his foot was rather seriously cut. A park keeper bandaged him and he was taken to hospital. The main ligament of the great toe had been severed; it was sutured and the boy made a good recovery. He sued (through his father) for damages for negligence on the part of the borough council. Mr. Justice Greaves-Lord found the defendants to have been at fault. They ought to have known that, if not carefully supervised, the pool would become a trap. They had given their park keepers instructions which, if carried out, would probably have averted the accident. The glass was a danger of which the council ought to have known. The park keeper had a rake with which he went over the pond and the heaps of sand alongside it. The type of rake did not go deep enough. The learned judge did not rule that the council must always provide supervision to prevent bits of glass from getting into the pond; but proper supervision could have prevented the accident, and there had not been proper supervision. Another boy had been injured in the same place not long before. An assistant park keeper knew of this earlier injury and, in breach of his instructions, omitted to report it further. The council was responsible for the negligence of its servants. There was prolonged legal argument over the responsibility for the child in the pool. Was he what the law calls an invitee, or was he merely a licensee, a person allowed to be present at his own risk? The court held that the boy was an invitee; the council had placed the paddling-pool and the sand heaps as an attraction for children, and the judge came to the conclusion that he could take judicial notice of the fact that most children paddle with bare feet. He awarded £50 damages to the child, and £19 10*s*. 6*d*. to the father as special damages for expenditure incurred in consequence of the injury. Thus to the difficulty of keeping sand and water clean in these places to which children resort there is now added the problem of sifting the sand to see that no foreign substance with a sharp edge is present.

The Doctor's Charges

A patient who had not paid his doctor's bill contended that the rate of charge was too high inasmuch as the doctor had less than 100 yards to travel when visiting him. The plaintiff, a doctor at Turnham Green, was suing the defendant, a professional man, in the Mayor's and City of London Court for £3 3*s*. for medical attendance, including six periodical visits. The charge per visit was 7*s*. 6*d*. The defendant thought 5*s*. would have been amply sufficient. The registrar of the court ascertained that appendicitis was suspected. If, he remarked, the patient was cured without the expense and danger of an operation he was lucky. Doctors, he explained, had to regulate their fees as nearly as possible to the social position of the patient. He gave judgment for the amount claimed and added a fee ("it will be rather more than the 7*s*. 6*d*. which you disputed") for the attendance of the plaintiff doctor at the court that day. As a pendant to these proceedings we may add the comments of a deputy county court judge in a Gloucestershire court a week or two ago. Doctors' bills, he remarked, ought always to be the first to be paid, whereas they were usually the last. The gratitude of patients evaporated in time, and the non-payment of bills led to many inadequate excuses.

VENEREAL DISEASE IN THE U.S.A.

(FROM AN OCCASIONAL CORRESPONDENT)

A CONFERENCE on the venereal diseases was held in Washington just after Christmas at the call of Surgeon-General Thomas Parran. Delegates were present from 45 States, and the district of Columbia, Puerto Rico, Hawaii, and some ten foreign countries. In all 900 delegates were registered and many others were present who did not register their names. Both the attendance and the vigour of the discussions surpassed all expectations.

The most practical proposal coming from the conference was that Congress should increase the $10,000,000 annual appropriation under title VI of the Security Act to $25,000,000 with the understanding that the main part of this difference is needed to combat syphilis. The proposal was voiced by Dr. A. T. McCormack, State health commissioner of Kentucky and president-elect of the American Public Health Association. Having pointed out the salient facts in the present situation: one million new cases of syphilis contracted yearly, less than half of these treated effectively, adequate facilities for diagnosis and treatment rarely available to the afflicted person and public health facilities for control totally inadequate, Dr. McCormack continued:—

"This nation has definitely embarked upon a program of social security. It has determined that the hitherto under-privileged and neglected shall be able to secure the comforts and necessities of life. We have provided pensions for the blind, assistance for dependent children, care for the crippled, and in a hundred other ways are paying untold thousands of dollars for our previous and continuing neglect in the prevention of such diseases as syphilis. The staggering price we have paid for our failure to control syphilis and similar preventable diseases is only of value in the consideration of the development of effective plans for public health prevention and control of such disasters. In different communities, it has been clearly demonstrated that syphilis, like tuberculosis, diphtheria, typhoid fever, yellow fever and small-pox, is a distinctly and definitely preventable disease. In order to accomplish this high purpose, it is necessary to improve Federal, State and local administrative and service machinery to the end that prevention, early diagnosis, and continuous treatment shall be available for every citizen in America needing service."

Dr. J. H. Stokes spoke on the clinical treatment of syphilis, emphasising the importance of adhering to the continuous alternating system of treatment shown to be the most effective by the studies of the coöperative clinical group.

"The most refractory stage of early syphilis," said Dr. Stokes, "is the seropositive primary, and it is during this stage that most patients present themselves for treatment. It is only by greatly increasing the amount of treatment called for in seronegative primary syphilis or in the fully developed secondary stage that the expectancy can be brought up to the general level. Secondary syphilis treated by intermittent methods yields even poorer results than seropositive primary, but if treated by a continuous system, the results closely approximate the best obtained in seronegative primary syphilis."

Bismuth, in the judgment of Dr. Stokes, has

definitely established its superiority over mercury, especially in the prevention of relapse. Frequent Wassermann tests are needed to control treatment. A return to a strong positive after a series of negative reactions in either early or latent syphilis is a serious warning. In every pregnancy the blood should be tested twice: first at the third month so that positive cases shall all receive treatment before the fifth month, and secondly in the eighth month to detect the possible transmission of infection during pregnancy. In the treatment of neurosyphilis Dr. Stokes considers malaria the best means of inducing fever but considers there is not much to choose between fever therapy and the administration of tryparsamide.

The clinical management of gonorrhœa was discussed by Dr. P. S. Pelouze who held that "if syphilis is allowed to receive the most attention, and so make the far more prevalent disease, gonorrhœa, appear a poor second in importance, our citizency will be played a rather sorry trick." However, Dr. Pelouze did not minimise the difficulty of controlling gonorrhœa. He admitted that no treatment known to-day will quickly render the patient non-contagious and that gonorrhœa can be transmitted to others so long as there is a single gonococcus present. Since there are no laws to compel treatment of carriers of gonococci "the field narrows to just what a medical mind can do with the mind of the infected patient." Pleasure-loving American youth, said the speaker, might be divided into three groups: the conscientious patients, the indifferent, and a large intermediate group who would follow treatment conscientiously only if someone took the trouble to make them understand the necessity. The present need is for the instructors who will take this trouble.

Dr. Pelouze's paper was read on the first day of the conference and was open to discussion in section meetings on the second day. No discussion was heard however in the section on public health administration where, if anywhere, it might have been expected. The general impression seemed to be that while his point was well made it represented an ideal to aim at rather than a practical administrative policy.

Dr. R. A. Vonderlehr, assistant surgeon-general in charge of venereal disease control, reported on the present activities of State health departments in this field. Twenty-five States have started new activities in venereal disease control as a result of subsidy already received under the Social Security Act. Sixteen States now administer their programmes through a separate division in charge of a "full-time" officer. Thirty-seven States administer drugs or free treatment; 21 provide dark-field examination for diagnosis. There are about 1000 free, pay, and part-pay clinics for the treatment of syphilis and gonorrhœa in the United States, or approximately one clinic to every 130,000 of the population. The distribution of these clinics is uneven. In the south where the high incidence of syphilis among the negroes makes clinics most desirable, the supply is below the average. Dr. Vonderlehr's conception of an adequate programme includes: the appointment of a full-time venereal disease control officer in every State department of health, a much more liberal policy with regard to the free distribution of antisyphilitic drugs, the adoption of reasonable standards of efficiency by State health departments before formal recognition is given to clinics for the treatment of syphilis and gonorrhœa, and a much more liberal allotment of funds for direct expenditures in the control of the venereal diseases.

IRELAND

(FROM OUR OWN CORRESPONDENT)

ROAD ACCIDENTS

LAST year there were 9602 road accidents in the Irish Free State, with 3932 persons injured and 205 deaths. The number of deaths was slightly less than in the previous year (226) and the number of injuries slightly more (3817 in 1935), but the number of recorded accidents was more than doubled. Of the accidents involving deaths, 201 in number, 71 were attributed to private cars, 39 to motor lorries (including steam lorries and road locomotives), 27 to pedal cycles, 16 to horse-drawn vehicles, 9 to motor-buses and coaches, 11 to taxis and hackneys, 8 to motor-cycles, 5 to electric trams, and 15 to motor vans and light commercial vehicles. The number of deaths on the roads has increased slightly, but with many fluctuations, in the last six years, while the number of persons injured has increased with little fluctuation from 2870 in 1931 to 3932 last year.

The number of fatal accidents in the Dublin metropolitan area in 1936 was 44, being 11 less than in 1935. Only one fatal accident was attributed to a pedal cyclist. The number of persons killed in the Dublin area is considerably below the average of the last six years, but the number of those injured is above the average, although less than in 1935.

The returns for the Irish Free State further show that the most dangerous hour of the day on the roads is from 7 to 8 P.M. The age-incidence of deaths is interesting. Of the persons killed 8·8 per cent. were children under six years of age, 18·1 between six and twenty, 19·5 were between twenty and thirty, 10·7 between thirty and forty, 8·3 between forty and fifty, 11·2 between fifty and sixty, and 23·9 over sixty. It is noteworthy that only 3 of the fatal accidents were attributed to drunkenness of a driver.

THE MEDICAL RESEARCH COUNCIL

The personnel of the Medical Research Council of the Irish Free State has been completed by the appointment by the Minister for Local Government and Public Health of Dr. Robert P. Farnan as chairman. Dr. Farnan is gynæcologist to the Mater Misericordiæ Hospital, Dublin, and professor of obstetrics and gynæcology at University College, Dublin (National University of Ireland).

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

VESICAL CALCULI IN AVITAMINOSIS

DURING the National Medical Week Dr. Paul Fodor read a paper in which he said that he had given rats McCarrison's vitamin A-free diet. He has carried on the experiments much longer than any other workers in this field, waiting for the animals to die naturally. With this method he has succeeded in producing vesical calculi in 90 per cent. of the rats. The stones were all secondary and infectious in origin. Every animal that had received the diet had an infection of the urinary tract, *Bacillus coli* could be cultivated, and the urine gradually became alkaline. Assuming a lack of vitamin A as a cause, Dr. Fodor investigated the vitamin level in the blood, but he failed to find any quantitative deviations. On the other hand, the condition cannot be attributed to the lack of vitamin alone; it must

be due to the interaction of several factors. The avitaminosis renders the animals prone to infections and the preponderantly carbohydrate diet changes the reaction of the urine and also the conditions governing the solution of its salts. According to Fodor it is the protein that is of the greatest importance in the lithogenous diet.

THE PYREXIAL TREATMENT OF NERVOUS AND MENTAL DISEASES

On the same occasion Dr. Stephan Somogy gave account to the experiences of the Budapest neurological and psychiatric clinics in the fever treatment of mental and nervous disease in the last 12 years on more than 1000 patients. They induced pyrexia in 873 instances, with malaria in 550 patients, in 135 with drugs, and in 188 with milk injections. With these various methods the following results were attained: with malaria, 20 per cent. were cured and 24·2 per cent. improved; with Neosaprovitan, 10 per cent. cured and 30 per cent. improved; with Pyrifer-Pyrago, 8·5 per cent. cured and 30 per cent. improved; and with milk injections, 12·7 per cent. cured and 25 per cent. improved. Thus malaria therapy proved the most efficacious. Somogy holds that the hyperpyrexia itself is the most important factor. In the manic-depressive psychosis, schizophrenia, and epilepsy there were no conclusive results. In the various other diseases the following were the results obtained. In tabes only some improvement in the symptoms was noticeable, chiefly in relieving the lancinating pains and the crises; in the chronic forms of epidemic encephalitis and in disseminated sclerosis the results were poor. In contrast with this the method was very successful in chorea minor, general paralysis of the insane, acute trigeminal neuralgia, acute peripheral facial paralysis, and sciatica.

PRESIDENTIAL ELECTION IN THE MEDICAL CHAMBER

After disputes and discussions lasting for years the Hungarian Medical Chamber has now been constituted. The presidential election took place recently and Dr. Tibor Verebélyim, director of the First Surgical Clinic of the University of Budapest, has been elected, with Dr. Ladislaus Csiky as vice-president. The council of the Chamber was elected by the representatives of the Budapest and country chambers. Altogether 81 country electors sent postal votes, while the 52 Budapest electors voted personally. The number of electors is always adjusted to the number of members, which is much fairer than the system prevailing in Rumania, where the medical chamber has just been introduced. There the presidents of the county chambers elect the national president, so that a president of a county with only 25 members has just as much influence as one who represents a chamber with a 1000 or more.

CHILD WELFARE IN HUNGARY

During the week also Prof. Kornel Scholtz, Minister of Public Welfare, gave some elaborate statistics, showing that in Hungary the infant mortality in the last ten years has fallen considerably. In the new-born (0–6 days), however, the position is not so favourable, emphasising the need for the more intense development of prenatal care. The great fluctuation in the mortality-rate of infants in the first three months is mainly attributable to summer diarrhœa, the curve of which is almost parallel with that of the maximum summer temperature. Another cause is influenza; in the four influenza years of the last decade 54,913 more of the population have died than in the intervening epidemic-free years, and 8600 of these were infants. The death-rate of children from 1–14 has been almost halved since 1920. This great improvement was due to the diminution of deaths from acute infectious diseases. It is striking that while the death-rate of respiratory diseases is very considerably diminished in all age-groups, in tuberculosis of other organs it rose considerably at all ages. A considerable improvement is noticeable also in the death-rate of other groups of diseases. The drop in deaths due to "congenital debility" of infants is clearly due to better medical services. In this respect the chief aims of Hungarian public health are: to develop better prenatal care; to augment the hospital accommodation for children suffering from acute infections; and to check diphtheria by the wider use of protective inoculation. For combating tuberculosis in children arrangements are being made for the adoption of Calmette's method. Finally, special care is to be taken in improving nutrition, which in some regions leaves very much to be desired, both qualitatively and quantitatively.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdrs. T. A. Cochrane and G. Rorison to *President* for course; and C. B. Nicholson to *Pembroke* for R.N.B.

Surg. Lt.-Comdrs. (D) D. Barker to *Vernon;* and D. C. Eglington to *Afrikander.*

Surg. Lt. J. L. S. Coulter to be Surg. Lt.-Comdr.

Surg. Lt. M. G. H. Heugh to *Excellent.*

Surg. Lts. (D) S. J. Atkinson to *Ganges;* W. G. Finnie to *Vernon* for R.N. Hosp., Haslar; A. G. K. Heberlein to *Wildfire;* C. E. Fitton, R. A. Hilton, and H. W. Gibbs to *Victory* for R.N.B.; and J. B. Morris to *Eagle.*

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lts. D. M. Dean and C. Seeley to be Surg. Lt.-Comdrs.

ARMY MEDICAL SERVICES

The War Office announces that Dr. H. L. Tidy, physician to St. Thomas's Hospital, has been appointed honorary consulting physician at the Queen Alexandra Military Hospital, Millbank, S.W., in succession to Col. A. G. Phear, C.B., F.R.C.P., whose tenure of appointment has expired.

ROYAL ARMY MEDICAL CORPS

Capt. W. H. Hargreaves, h.p. list, is restd. to the estabt.

Short Service Commissions: Lt. (on prob.) F. T. Moore is secd. under the provisions of Art. 213, Royal Warrant for Pay and Promotion, 1931.

ARMY DENTAL CORPS

Short Service Commissions.—The undermentioned Lts. to be Capts.: R. Edwards, A. F. Town, R. G. Kett, P. J. Pigott, H. J. Burns-Jones, and W. J. Constantine.

TERRITORIAL ARMY

Maj. A. H. D. Smith, M.C., T.D., to be Lt.-Col.

Lts. T. H. Dockrell and K. M. Morris to be Capts.

N. J. Nicholson to be Lt.

ROYAL AIR FORCE

Group Capt. H. A. Hewat to Headquarters, Bomber Command, Uxbridge, for duty as Deputy Principal Medical Officer, vice Group Capt. T. Montgomery.

Flight Lts. P. J. McNally to R.A.F. Hosp., Cranwell; and J. F. Dales to Central Medical Establishment, London.

Flying Offr. D. S. MacL. Macarthur is promoted to the rank of Flight Lt.

Flying Offr. G. B. MacGibbon to R.A.F. Station, Scampton.

Dental Branch.—Flight Lt. J. E. Tyrrell to R.A.F. Hosp., Aden.

INDIAN MEDICAL SERVICE

Maj.-Gen. A. W. M. Harvey, K.H.S., retires.

DEATHS IN THE SERVICES

Lieut.-Colonel FRANCIS ALEXANDER CARON SCRIMGER, V.C., who died on Feb. 13th at Montreal, was the younger son of John Scrimger, principal of the Presbyterian College, Montreal. He served in the European War as medical officer with the 14th Battalion, Royal Montreal Regiment, to which he was attached from the Canadian Army Medical Service, and when a captain he won the V.C. on April 25th, 1915, for his gallantry in carrying wounded men from an advanced dressing station near Ypres which was being demolished by shell fire. Later he became assistant professor in surgery at McGill University and surgeon to the Royal Victoria Hospital, Montreal, his special interest being thoracic surgery. Colonel Scrimger married in 1918 Ellen E. Carpenter, late C.A.M.C., and leaves a son and three daughters. He was 57 years of age.

Colonel JOHN MAXWELL GOVER, D.S.O., who died on Feb. 11th at Nevern-square, London, at the age of 59, was educated at Durham University and St. Bartholomew's Hospital, and qualified M.B., B.S. Durh. in 1898. After house appointments at the Royal Infirmary, Newcastle, and the Brompton Hospital, he was appointed assistant demonstrator in anatomy and physiology at the Durham College of Medicine. He joined the Territorial Army and became assistant director of medical services of the 50th (Northumbrian) Division with the rank of colonel. At the outbreak of the European War he was assistant surgeon to the Fleming Memorial Hospital; he served from 1914 on, was mentioned in dispatches, and received the D.S.O. in 1918.

PANEL AND CONTRACT PRACTICE

Medicines Urgently Required

MOST insurance practitioners are aware that under the Terms of Service they are required to supply, and not merely to prescribe, drugs or appliances which are needed for immediate administration or application, or for use before a supply can conveniently be obtained from the chemist. In England and Wales the yearly rate of payment for this task is usually 1*s.* 3*d.* per hundred persons on the list, but in some areas where the liability for emergency dressings is greater a rate of 2*s.* 6*d.* may be sanctioned, or payment may be made at a flat rate for each occasion on which dressings are supplied in an emergency. Prescriptions marked "urgent," which carry a double dispensing fee, may be issued after the chemists' shops are closed, but only if it is essential that the drug or appliance should be supplied the same day and if there is a resident chemist reasonably accessible who will make it up. If there is no such chemist it rests with the doctor to supply the drug or appliance himself.

An insurance practitioner recently complained that a chemist had refused to dispense the medicine he prescribed. On investigation it appeared that at about 10 P.M. on Christmas Day a prescription for mist. camph. co. of the National Formulary was issued, and that a representative of the insured person called at the private house of the chemist and asked him to dispense it. Not unnaturally the chemist declined. The relatives then discovered the private address of another chemist who was persuaded to go to his shop and dispense the mixture, shortly before midnight. He in his turn was not unnaturally annoyed, and informed the insurance committee accordingly. And so, because a practitioner had failed to make himself acquainted with his Terms of Service the patient and her friends, as well as both chemists, were put to inconvenience late at night, apart from the unnecessary work thrown upon the insurance committee in dealing with the complaint he raised.

Medical Insurance Practice

Insurance practitioners have lately received copies of the Medical Benefit Regulations, 1936, which include their Terms of Service, but it is doubtful whether many have the time to study these regulations exhaustively. It is opportune therefore that the fourth edition of "Medical Insurance Practice," the excellent handbook by R. W. Harris and Leonard Shoeten Sack, should have been issued almost concurrently. The many alterations in the regulations since 1929, when the previous edition was issued, have made revision imperative, and now, at an almost nominal price, practitioners may obtain an authoritative explanation of their duties and responsibilities, written mainly in the direct second person, reference to which may well settle in a minute or two those nasty little problems that are likely to arise at any time.

Take for example spinal jackets, which may now be prescribed when required for treatment of fractures, dislocations, or diseases of the spine. A footnote (p. 85) points out that it has been held that a spinal jacket is necessary and required in connexion with treatment (and the original cost and cost of periodical repair may therefore be debited to the drug fund) if it is likely to restore or maintain an insured person's capacity for work, but not if it is used for improving the appearance of the patient —e.g., to hide a hump on the upper half of the spine.

The many appendices contain information which is invaluable; such as extracts from the report of the advisory committee on the definition of drugs for the purposes of medical benefit. Reference to the list of "never a drug" might save the annoyance of an inevitable surcharge. The book is well indexed, and much ingenuity must have been expended in the compilation of this all-important section. The preface to the first edition addressed the book to the busy general practitioner, and added that the authors, while excluding matters too remote to be of interest to him, had tried to avoid leaving unanswered any question, arising in his daily insurance work, on which he is likely to seek information in its pages. Their exhaustive revision brings the book to a standard if anything higher than that of the earlier editions. It is obtainable from the British Medical Association at 2*s.* post free.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A special course in physiology and anatomy for the primary F.R.C.S. examination will be held on Mondays, Wednesdays, and Fridays, at 5.15 P.M., at the Infants Hospital (Feb. 22nd to May 24th). A course in proctology will be given at St. Mark's Hospital (March 1st to 6th); in orthopædics, at the Royal National Orthopædic Hospital (March 8th to 20th); in infants' diseases, for candidates for the D.C.H., at the Infants Hospital (March 8th to 13th); in urology, at All Saints' Hospital (March 20th and 21st). M.R.C.P. courses will be held in chest diseases at the Brompton Hospital (twice weekly at 5 P.M., Feb. 22nd to March 20th); in chest and heart diseases, at the Royal Chest Hospital (Mondays, Wednesdays, and Fridays, at 8 P.M., March 1st to 20th); in neurology, at the West End Hospital for Nervous Diseases (afternoons, March 8th to 20th). A mock trial of a motorist accused of being under the influence of drink will be held on Thursday, March 11th, at 8.30 P.M. Admission will be by ticket only, and full particulars can be obtained from the secretary of the fellowship, 1, Wimpole-street, W.

CORRESPONDENCE

SURGICAL TREATMENT OF CARDIAC ISCHÆMIA

To the Editor of THE LANCET

SIR,—Mr. O'Shaughnessy's lecture published in your issue of Jan. 23rd is evidence of the admirable work done at the recently established cardiovascular clinic at Lambeth Hospital, and also at the Buckston Browne Farm. He is to be congratulated on his evidently remarkable surgical technique, as well as on the clarity with which he describes his operation and its results; and above all he is to be congratulated on being so scrupulously careful not to claim as yet to get brilliant clinical post-operative results, but rather to content himself with the demonstration that cardio-omentopexy is in his hands "a feasible operation attended with a low immediate mortality."

It is to be hoped that others may be equally cautious in their choice of cases for omentopexy, and in their claims for a successful result. For it is clear that this operation is tempting progressive surgeons. I note that cases of omentopexy were shown at the clinical section of the Royal Society of Medicine last week. The more unstable of our anginal patients already begin to demand surgical treatment. Finally, that astute and up-to-date journalist, "Dr. Harpole," has included omentopexy in his "Surgeon's Diary." In a word, these and many other portents indicate that we are in for a spate of omentopexy. But before the flood descends upon us and perhaps carries away hastily improvised barriers of clinical experience and judgment, there are a few observations which I would like to make. And if these observations seem to be somewhat elementary in nature I do not seek to be excused. For is it not true that in these days of elaborate investigations and treatment, elementary considerations are apt to be forgotten?

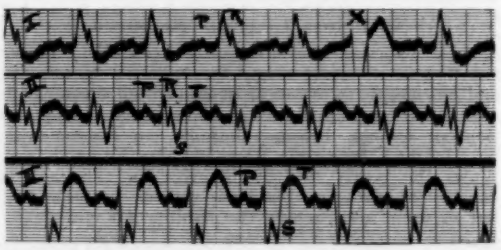
Lord Dawson has epitomised the problem in the final paragraph of his introduction to Mr. O'Shaughnessy's lecture:—

> "It follows therefore that in a considerable coronary occlusion collateral circulation must eventuate if the myocardium is to be saved. *Such a compensatory circulation can form of itself:* where it does not do so, the use of surgical means to establish it is essentially reasonable and its prospect should be good in carefully selected cases *provided the capillary bed itself is not too degenerate to profit by a renewed arterial supply.*"

I would like particularly to emphasise those words of Lord Dawson which I have italicised. Let us never forget that "a compensatory circulation can form of itself," and that consequently it is possible, indeed probable, that some cases of cardiac ischæmia may recover in spite of, and not because of, the surgeon.

Angina pectoris is a much maligned disease. We never open a newspaper without reading of the sudden cardiac death of some distinguished individual. Thus daily it is hammered into our minds that angina is a very dangerous condition. We tend to forget that if an anginal patient lives within his limits and obeys a few very simple rules, he often leads quite an active and useful life for many years. He may indeed even lose his angina and die of something else. Of James Mackenzie's 214 fatal cases,[1] for example, approximately one-half survived for five years, and 44 of them lived for more than ten years—not a bad record when we find that 77 of the 106 patients who survived the five-year period were already over sixty years of age at the onset of their angina! To quote Mackenzie again, "The ages at which death occurs (from angina) do not differ materially from the average at which death occurs from disease in general"—a somewhat obscure remark, the interpretation of which would seem to be that angina does not materially affect the expectation of life.

The names of distinguished members of our own profession who have done splendid work during long periods of time, though suffering from angina, leap to the mind at once. One wonders had these men been subjected to omentopexy and survived, would they have been rendered more efficient? One



Electrocardiogram of Mr. A in 1930. Bundle-branch block and one ectopic ventricular beat (X).

of my friends has suffered from angina for eighteen years. Some years ago he had a coronary occlusion. He has led an exceedingly busy professional life and is still working at the age of seventy-five, and is no doubt congratulating himself that omentopexy was not the vogue eighteen years ago.

Many of us can recall spectacular recoveries from chronic heart failure of arterio-sclerotic origin. Another of my friends had cardiac asthma in 1934, with a tension of 240/140 and alternation. In 1935 he had an alarming attack of acute pulmonary œdema, and later on a transient hemiplegia. From October, 1935, till September, 1936, he was waterlogged, and his intense dyspnœa could be controlled only by morphia. A few weeks ago he came up from the country and had lunch with me, free from œdema, and sleeping peacefully at night without any sort of sedative. What a triumph he would have been for omentopexy had this been performed last spring (and had he survived it!).

One more example.

Mr. A, aged 54, was seen with Dr. Brebner Scott in April, 1930. He gave a history of angina of effort and of gasping attacks at night. His blood pressure was 200/130. In August of the same year he had a coronary thrombosis, after which he developed a bundle-branch block (vide electrocardiogram) and became waterlogged, with paroxysmal nocturnal dyspnœa. He was nine months in bed, and for some four months his condition appeared to be quite hopeless. In March, 1931, however, he was up for half the day, and in May, 1931, he returned to his business at Covent Garden, getting up at 5 A.M. and working till 4 P.M. without any œdema. He worked till September, 1932, when he broke down again, after influenza. In February, 1933, he was still up and about and free from œdema. He died of chronic cardiac failure in King's College Hospital in May, 1934. Again, what a surgical triumph he would have been if operated upon, successfully, in February, 1931!

When one reflects on cases such as these—and any clinician of experience could quote others like them—one feels that after omentopexy, as in many

[1] Mackenzie, J. (1923) Angina Pectoris, London.

other conditions, the vis medicatrix naturæ may sometimes be responsible for a successful result.

At the same time there is no doubt that a case has been made out for this operation. The difficulty is, of course, the decision as to when to operate. One hesitates to advocate surgery so long as there is a reasonable prospect of the heart establishing its own collateral circulation, and one must not wait until the capillary bed is, in Lord Dawson's words, too degenerate to profit. We admire the surgical skill which restored the sprinting power to a greyhound, a branch of whose coronary circulation had been ligated. But this experiment would have been more convincing as an argument for omentopexy in man had the greyhound been ten or more years old at the time of the operation.

Finally, another depressing thought: why is the Talma-Morrison operation apparently extinct? *Pace* Prof. Grey Turner, I really cannot believe that it has been abandoned only because the patients will not be persuaded to become abstainers!

I am, Sir, yours faithfully,

Montagu-square, W., Feb. 10th. MAURICE CASSIDY.

OXYGEN TENTS

To the Editor of THE LANCET

SIR,—Rather over a year ago the British Red Cross Society deposited in each of the twelve teaching hospitals of London an oxygen tent of the Guy's Hospital pattern so that a wide experience of this method of treatment might be gained. We who were appointed as a small medical advisory committee would in the first place like to thank the Society for their public-spirited action, the value of which is indicated by the reports received from the various hospitals. All these reports emphasise the value of the oxygen tent in the treatment of grave cases of anoxæmia. One of these reports, that from St. Bartholomew's by Dr. D. C. Reavell, was published in your issue of August 1st, and we may quote his statement that from the clinical point of view the results were better than with any previous method of oxygen administration, and patients were kept in the tent continuously for periods up to 12 days without any difficulty. A report from another hospital emphasised its value in the treatment of children suffering from bronchiolitis or bronchopneumonia; "once in the oxygen tent these small children appear to resent being taken out,[1] and there is no question that this apparatus is highly successful and almost the only method of achieving the results attempted." In another hospital a child who had had one lung removed by operation was in the tent for a considerable time and the treatment proved of the greatest benefit. Another report describes a girl, aged 11 months, whose colour improved and who appeared much happier within about half an hour of entering the tent; the pulse-rate fell and the respiration-rate also fell, and the child made a good recovery. Another patient, aged 65, with chronic bronchitis and asthma, strongly objected to the tent when it was first used for him, but was later readmitted to hospital very cyanosed and dyspnœic and almost moribund. This time he felt so much better in the tent that he willingly persisted with it and made a remarkable recovery after some four days. Later he did not remember ever having been in the tent at all. It is perhaps unnecessary to multiply instances of the beneficial effect of a treatment which merely ensures that a patient is getting a known high percentage of oxygen.

[1] This point was also observed at another hospital.

When the details of managing the patient are considered, it is perhaps natural that there should be some difference of opinion. Dr. Reavell stated that the tent could be set up and new people instructed in its management in two hours; when once running no undue call was made upon the house physician, and apart from general supervision by the house physician it could be managed entirely by the ward clerks and nurses; when once the sister and nurses had become accustomed to the tent it was little or no hindrance to general nursing. Another report says that the "oxygen control presents no difficulty, and a concentration of 50 per cent. could easily be obtained and maintained. The gas analyses, of which oxygen is the most important, can easily be carried out and can soon be taught to sisters and nurses." In one hospital it was noted that the tent could be used satisfactorily for surgical cases; but in another hospital the nursing of these cases in the tent was found to be extremely difficult. Several reports emphasised the difficulty of controlling delirious and fractious patients in the tent. This difficulty is common to all methods of oxygen administration.

Some criticism of the details of the manufacture of the tent were expressed; but this is perhaps not surprising considering that it was the first time that this particular type of tent had been made up in quantity in this country, and the firm employed had had no previous experience of this kind of work. The chief criticism was the flimsiness of the material so that a stronger and more substantial material is now being used in all the tents that are being made at present.

The Red Cross Society offered the tent to the hospitals for purchase at a little under half their original cost, and seven of the hospitals accepted this offer. It may perhaps cause surprise that this offer was not accepted by five of the hospitals; but in four cases the refusals are thought to be due to certain technical imperfections in the tent, or to a preference for a tent of another type or some simpler method. In the remaining hospital the patients who had been ill enough to require this treatment were so few that it was felt that for the time being a tent could be hired when desired and that an improved model might be forthcoming later.

A final word may be said about the action taken by the London County Council which controls a very large number of beds. For about a year now they have had twelve tents in operation and they are hoping to increase the number so that each general hospital and each fever hospital will have at least one tent.

In our previous letter we stated that arrangements had been made by one of us to send a tent to any part of the country at the request of any medical man, and that a physicist, not medically qualified, would accompany the tent. The demands on this "Oxygen Tent Service" have steadily increased during the last year, so that it has now been possible for it to launch out on its own account as an independent concern. Applications should now be made to T. W. Adams, A.Inst.P., Oxygen Tent Service, 33, Devonshire-street, W.1. Telephone No.: Welbeck 2003, and at night Gerrards Cross 1163. This service, which supplies British made tents, together with the two other services in London which supply American tents, should be sufficient to meet all the demands for this particular type of treatment at the present time.—We are, Sir, yours faithfully,

REGINALD HILTON,
W. J. PEARSON,
E. P. POULTON.

London, W., Oct. 12th.

THE SINCLAIR FOOT-PIECE

To the Editor of THE LANCET

SIR,—I have read with appreciation the lecture by Mr. Salisbury Woods in your issue of Feb. 6th on progress in the treatment of factures. As one of the surgeons who worked for a time under the direction of Major Sinclair during the war, and who has followed his treatment of fractures with the greatest interest since, I feel that I must correct the reference made to the Sinclair foot-piece. This foot-piece was never meant to sustain a tractile force greater than 4 lb. When properly applied the strips of adhesive material fixing the Sinclair foot-piece do *not* overlap on the dorsum of the foot, and the whole of the apparatus would be pulled off with a weight much exceeding 4 lb. The function of the foot-piece was mainly to control rotation of the foot and not to be a point for the application of weight extension to control shortening in the fractured femur. It was, in fact, only an adjunct to skin traction applied to the thigh. I have not seen a case of sloughing of the skin following the use of this foot-piece for the purpose for which it was designed. I am, Sir, yours faithfully,

London, W., Feb. 12th. H. ERNEST GRIFFITHS.

MEDICAL PRIVILEGE

To the Editor of THE LANCET

SIR,—May I thank you for your very helpful and sympathetic leading article dealing with my Bill on this subject, and at the same time make some comments upon the incident. Both the Bill of 1927 and the recent one were drawn by a skilled legal Parliamentary draftsman. The Bill of 1927, as I stated in my letter (Feb. 6th, p. 349), was supported by five eminent lawyers who actually added their names to my Bill. The recent Bill differed from the earlier one in two particulars only: it extended the operation of the Bill beyond the class of venereal diseases to which the 1927 Bill was restricted, and it added clauses providing a further safeguard against abuse. Both the Bill of 1927 and the recent Bill were "passed" by Lord Atkin. The "legal snags" discovered by the Solicitor-General seem to have escaped the observation of the very competent authorities I have named.

Two reasons made me extend the operation of the Bill. (i) As I explained in my letter to you a Bill restricted to venereal diseases would fail in its purpose inasmuch as any party pleading its protection would be at once stigmatised as a victim of venereal disease. (ii) Protection of medical confidences is necessary in other branches of practice. For example, certificates given by medical officers of health in the case of stillborn infants have hitherto been regarded as confidential, but in a recent case the doctor was compelled to disclose the cause of the death of the child, which conveyed a reflection upon the parents; again the case-history confidentially imparted and entered upon the cards of panel patients by the doctor is not protected from revelation in a court of law. In the Scottish Maternity Bill now before Parliament proper stress is laid upon the supreme importance for reducing maternal mortality of antenatal observation of the pregnant woman. Maternal mortality is probably highest in the young unmarried mother and it is surely foolishly short-sighted to withhold from this class of case the most explicit assurance that their confidence will be respected; early consultation, which is one of the chief purposes of the Bill, would be grievously hampered but for the complete trust reposed by the patient in the doctor respecting her professional confidences.

In his defence of the monopoly by solicitors of professional secrecy as contrasted with the absence of privilege for the no less important confidences of the doctor and the priest, the Solicitor-General used the curious argument that solicitors enjoy this privilege because it has been "erected by the custom of the law," and that it would be difficult to put into statutory form the claims for similar privilege by the doctor and the priest.

The perfectly indefensible and in its results widely mischievous refusal of privilege for medical confidences is producing chaos in the administration of the law. I have knowledge of recent cases in which judges imbued with the obligation of the medical practitioner to preserve secrecy (as was evinced for example by Mr. Justice Charles in the instance quoted in your leader) have excused the medical practitioner who has pleaded that honourable obligation from giving evidence. Were a doctor or a priest to refuse to betray professional confidences and to suffer imprisonment for doing so there can be little doubt that public opinion would be outraged and would demand alteration of the law. When the law is so clearly in conflict with public opinion it is surely better to alter it by orderly Parliamentary procedure rather than in response to an explosion of resentment in an individual case.

I am, Sir, yours faithfully,

House of Commons, Feb. 15th. E. GRAHAM-LITTLE.

TREATMENT OF FRACTURE OF THE NECK OF THE FEMUR

To the Editor of THE LANCET

SIR,—Mr. E. T. Bailey's instrument for introducing a Smith-Petersen nail, described in your last issue, has given us a simple method of placing the nail with accuracy along the femoral neck. I cannot, however, accept the statement that the instrument "obviates the necessity . . . for calculations or for a lateral X ray during operation." Mr. Bailey does not specify the type of femoral neck fracture he treats by his technique. I will confine my remarks to the medial type of fracture, for the lateral and pertrochanteric types always heal well without nail immobilisation.

All extra-articular operations are dependent for their success upon the accuracy of reduction of the fracture and the maintenance of this reduction until the fragments are immobilised by the nail. The steps of the operation must be continuously under radiological control until the final immobilisation by the nail in the reduced position is achieved. No instrument can replace this X ray control. I have no doubt that the technique advised by Mr. Bailey can give some good results, but these days we are most concerned in lessening the percentage of unsatisfactory results; and I feel that in advising a technique that replaces close radiological control Mr. Bailey is advocating a retrograde step.

Not all fractures of the medial type are reducible by traction in a Thomas splint. I agree that sometimes by this method alone an accurate reduction is obtained. It should be the routine method of preliminary treatment; the patient is made comfortable, nursing is easier, and it gives a period during which the patient can be investigated and the general condition improved.

But there remains still a group of patients in whom accurate reduction has not been attained. Most authorities are agreed that for this group there can be no routine manipulative reduction, simply because the displacement of the fragments is not constant.

The manipulations necessary will be governed by the deformity remaining, and the deformity is recognised only by radiograms taken in two planes. It seems wiser to carry out these manipulations on an orthopædic table instead of the "complete bed procedure." With such a table the reduced fracture can be securely fixed and X ray control is greatly facilitated. In introducing the nail, unless steps are taken to prevent it, the oncoming nail may displace the head fragment from its position on the neck; this is most apt to occur in the subcapital type of fracture. This displacement may not be recognised in the antero-posterior film but is readily seen in the lateral view. Accordingly X ray control must be continued until the operation is completed.

All of us with experience in this operation are familiar with its unexpected difficulties, difficulties only surmounted by planning on clear radiograms as the operation proceeds. Only by a technique allowing the fewest errors can the percentage of unsatisfactory results be lessened. The operation may sometimes be tedious to the surgeon, but under local anæsthesia it is quite a safe procedure even in the very elderly.

I am, Sir, yours faithfully,

WILLIAM GISSANE.

St. James' Hospital, London, S.W., Feb. 14th.

ARTIFICIAL PNEUMOTHORAX ON STATISTICAL TRIAL

To the Editor of THE LANCET

SIR,—Your annotation in last week's issue on the work of the pneumothorax subcommittee of the Joint Tuberculosis Council raises the whole question of the applicability of statistics to clinical problems. In the investigation you describe, a committee of experts spent four years in the classification and follow-up of a very large number of patients treated by artificial pneumothorax, and compared their fate group by group with control material which was admittedly not strictly comparable. The result was disappointingly inconclusive.

Needless to say, it would be a good thing to have statistical backing to clinical judgment, as it is difficult for anyone who practises a special form of therapy not to be prejudiced in favour of the belief that his patients are better so treated than left alone. Even allowing for a bias of this nature, clinicians of experience are so unanimous in believing pneumothorax treatment to be of great value in suitable cases that it is worth while examining more closely the discrepancy between clinician and statistician. The cause of error does not need prolonged search; it lies in the fact that the control group consists of patients with a substantially better prognosis treated conservatively than the A.P. group.

Until recently pneumothorax was rarely tried except in patients who failed to improve with several months of sanatorium treatment, and failure to respond to treatment obviously indicates a worse prognosis than a good response. To this group may now be added a relatively small group of patients in whom pneumothorax is tried without delay, as experience has taught us that their prognosis will be much improved thereby.

Now the fault of the statistician in this inquiry is that he concentrates on the anatomical extent of the lesion, number of lobes affected, &c., and not on the direction in which the disease is progressing while the patient is under treatment. A fibrotic scarcely active lesion of one lobe in which the patient has almost established a condition of symbiosis with his bacilli is classified in the same group as a tuberculous lobar pneumonia. The first patient will be treated conservatively, and the second will have a pneumothorax tried with the knowledge that therein lies practically the only chance of recovery, and that this is by no means good owing to the tendency of this type of disease to spread whatever treatment is applied.

The final impression which remains after reading the report is that the position of pneumothorax remains as it was before; if anything has been tried and found inadequate, it is the application of the statistical method to this particular clinical problem. One feels that the investigators have been thorough and dispassionate, but that the inherent difficulties of the problem have unfortunately prevented their achievement from being of the high value which the quality of their work merited.

I am, Sir, yours faithfully,

Harley-street, W., Feb. 15th. ANDREW MORLAND.

ANOREXIA NERVOSA

To the Editor of THE LANCET

SIR,—I was much interested in Dr. J. H. Sheldon's article on anorexia nervosa in your last issue, and am impressed by his suggestion that we are dealing with a functional form of Simmonds's disease of psychological origin. In the same way I believe many cases labelled Fröhlich's syndrome are really instances of a temporary pre-pubertal obesity due to a functional delay in the development of the pituitary. I can corroborate from my own experience that anorexia nervosa is often preceded by obesity, and that being teased about this (powerfully aided by the fashionable cult of slimness) is frequently the incentive which starts the process of self-starvation. The subjects of this condition are generally feminine Peter Pans who are afraid of growing up, and now that we realise the close association between the emotional centres in the diencephalon and the pituitary gland, we can understand how the emotional state may inhibit pituitary function.

But I am still puzzled by the blood-sugar curves. Dr. Sheldon's 1st and 5th cases show practically no rise after 50 grammes of dextrose, whereas simple fasting causes the curve to approximate to the diabetic type. A flat curve indicates rapid absorption of dextrose, yet these patients do not put on weight in consequence. Different observers give very varying descriptions of the blood sugar in Simmonds's disease. H. Zondek states that it was usually within normal limits in his cases. Wolf states that sugar tolerance is diminished in Simmonds's disease resulting at times in glycosuria. Goldzieher on the other hand considers a constantly low blood sugar and a considerable increase in sugar tolerance typical of every hypopituitary case, whether of the obese or lean type. Wilder has seen hypoglycæmic crises which were readily relieved by sugar. We should expect Houssay's diabetogenic hormone to be diminished with lessened anterior pituitary functions, so that a lowered blood-sugar curve is perhaps to be anticipated from the unopposed action of insulin. Several observers describe insulin sensitivity but in my experience these patients put on weight more quickly under appropriate psychological treatment if also given insulin well covered by dextrose. Even dextrose alone is helpful. It would therefore appear that the mechanism for storing carbohydrate may be present even in excess of normal if only it is provided with adequate fuel. It is also possible that the loss of the normal adrenotropic action of the pituitary leads to a functional adrenal insufficiency. Demole (*Presse*

médicale, 1936, **44**, 543) gives as its characteristic features (1) asthenia without pigmentation or much lowering of the blood pressure, (2) chronic if vague digestive disturbances, (3) fasting hypoglycæmia which is converted into hyperglycæmia by the injection of cortical extract. This third point might prove to be of diagnostic value.

Dr. Sheldon's paper certainly provides food for reflection on the influence of the emotional state on endocrine functions. It is the more important because anorexia nervosa seems to be on the increase. This I attribute to the increasing frequency of tension between mother and adolescent daughter, the fashionable fear of obesity, and the fear of going out into a world fiercely competitive in work and games alike.

I am, Sir, yours faithfully,

W. LANGDON-BROWN.

Cavendish-square, W., Feb. 15th.

To the Editor of THE LANCET

SIR,—Many will agree with Dr. Sheldon that this disease is often accompanied by changes indicative of pituitary dysfunction. At the Maudsley Hospital biochemical and metabolic investigation of cases of anorexia nervosa have been carried out independently during the past year. These appear to confirm many of Dr. Sheldon's views. The publication of the results have been delayed so as to compare them, if possible, with a series of control cases from patients having other types of psychological disorder and weight disturbance.

The whole problem of loss of weight in illness supposed to be psychologically determined is of extreme interest and urgently requires investigation; work done here, for instance, has shown that many of these patients make only slow improvement even when taking a high calorie diet. Anorexia nervosa provides an exceptional chance of studying the complicated interrelations of metabolic and psychological changes. It is to be hoped that Dr. Sheldon's paper will stimulate a very wide interest in the various aspects of this syndrome; if so, it may soon be possible to deduce observations applicable to its more satisfactory treatment.

We are, Sir, yours faithfully,

WILLIAM SARGANT,
W. S. MACLAY.

The Maudsley Hospital, Denmark Hill, S.E., Feb. 13th.

TUBERCULOUS ABDOMINAL GLANDS

To the Editor of THE LANCET

SIR,—May I now reply to some of the points raised by Dr. Pask and Dr. Wilkinson? The proportion of children and young persons enjoying the fresh air, sunshine, and good food in institutions who require surgical intervention is not known to me. When the diagnosis is positive operation in such a patient may be avoided with an easier mind. Those operated on in our series were mostly workers, many of them farm labourers, who had been well-fed and had had an open-air life, but not much rest. Symptoms had generally been insufficient to prevent work until admission. Most were actual or potential emergencies and no patient was operated on merely to make a diagnosis. The tendency to the formation of adhesions in these patients is high and such an operation would not assist natural cure. There is no doubt that judgment may decide in favour of operation to clear a doubtful case when a ward is receiving. A waiting-list amounting to double the number of beds and the knowledge that the patient will be returned if sent out unfit for work are factors which are apt to weigh. The number of institutional beds available for long-continued cases is not large if all doubtful cases are to be treated. The serious mortality from abdominal tuberculosis in the early years of life leaves a type of patient with a tried resistance, which, helped by restful conditions and good food, improves with time.

The Registrar-General's reports show a steady reduction in the annual mortality from abdominal tuberculosis in England and Wales to nearly one-sixth between 1910 and 1935 (4345 persons in 1910 to 750 in 1935), presumably due to cleaner milk. The corresponding mortality from obstruction has remained throughout at some 2500 persons, with a recent tendency to rise. The varieties are not officially distinguished, but the commonest causes of acute obstruction in children and young adults are bands and adhesions. The operative mortality in expert hands is very high.

Of the 10 fatal cases in our paper 3 deaths were due to the operation, 3 to strangulation, 1 to appendicitis, 1 to hemiplegia (two years), and 2 to phthisis (three years and two years). Of 10 patients with acute and 3 with subacute obstruction, 10 recovered. Ten of the reoperation cases had been initially operated on elsewhere for acute symptoms. We managed to retain all our own failures in this respect, hence the large proportion. There was one fistula case successfully dealt with by resection of the gut and attached caseous gland, before emaciation became severe. There were two keloid scars which subsided without radiation; three ventral hernias were all successfully operated on and cured. Carson pointed out that operation in caseous cases must be evaluated on the grounds of necessity not of choice.

Future prevention will depend on providing clean milk at a cheap rate, on dealing with such archaic anomalies as sweeping up the dust in the tube railways instead of extracting it, on fixing the dust in railway tunnels by suitable spraying, and on greatly reducing the sojourn of the population in the tubes by having universal "zone" fares and the completed tickets available on the automatic machines. Phthisical persons and carriers of other infectious diseases should be individually isolated, not herded together.

I am, Sir, yours faithfully,

London, W., Feb. 15th. G. H. COLT.

DEFOE'S STORY OF THE PLAGUE

To the Editor of THE LANCET

SIR,—If a mere layman is allowed to differ from the grave and reverend seigneurs who have contributed the series Grains and Scruples, may I be permitted to question the accuracy of the statement on p. 1543 of your Dec. 26th issue as to Daniel Defoe's story of the Great Plague being merely a journalistic account of an event of which he could know nothing, he being then, according to your contributor, a baby of two or so. Though this idea was at one time held, more recent researches suggest otherwise. G. A. Aitken, a recognised authority, gives his birth as some time in 1659. Therefore he would be six at the time of the Plague. Six years of age at that period would make Defoe—who also must have been a precocious urchin—quite able to absorb lasting impressions of such a tragic time, and it would certainly seem on this evidence that his story of the Plague may be regarded as built on a foundation of personal recollections even though these are added to by consultation of the documents available.

I am, Sir, yours faithfully,

Mulberry-close, S.W., Feb. 10th. E. J. HOLLAND.

ENDOMETRIOMA OF THE VULVA

To the Editor of THE LANCET

SIR,—No single theory will explain the origin of all endometrial tumours of the vulva. Samson's implantation theory appears to account for such cases as that reported to the North of England Obstetrical and Gynæcological Society on Oct. 30th by Mr. T. N. A. Jeffcoate (*Lancet*, 1936, **2**, 1336), in which it was most likely that endometrial cells from the menstrual blood were implanted into the raw surface of a cavity formed by the rupture of a post-operative wound. Other cases, occurring in women who have undergone no previous operative measures, with no history of injury to the vulva, and in the absence of any hernial sac, can only be explained as developmental abnormalities.

In the human embryo at the third month the inguinal fold can be demonstrated as an outgrowth from the Wolffian ridge. The point of the outgrowth is the junction of the uterine and Fallopian segments of the Müllerian ducts within the Wolffian ridge. In the inguinal fold the round ligament of the uterus is developed, and it is presumed that, to use a simile of Comyns Berkeley, during the building of the female genital house, some chips of the Müllerian structure are carried away by the developing round ligament to find a resting place in the part of the labium in which this ligament becomes dispersed; and that these chips become activated during the reproductive period of life, perhaps under the influence of œstrin. In support of this explanation may be mentioned other tumours—to wit, dermoid cysts of the floor of the mouth, and teratoid tumours of the testicle—which rarely become clinically evident before puberty.

The comparative rarity of endometrial tumours of the vulva, of whatever origin, is shown by the fact that Jeffcoate, before reporting his case, was able to find only six others on record.

CASE REPORT

Mrs. A., of Hog Eye, Arkansas, nullipara, aged 36, first consulted us in regard to a painful swelling, of one year's duration, in the right labium majus, on Feb. 1st, 1936. She described it as feeling as though there were a cockleburr under the skin, which became more painful during the latter half of her menstrual period, and partially subsided during the following week. She believed it was a hernia, for which she had been wearing a truss for two years.

On examination the inguinal region was normal. The upper half of the right labium was swollen, and at the extreme upper end could be felt a firm tumour, approximately almond-sized. Bimanual examination of the pelvic organs revealed no abnormality, and there had been no change in the menstrual habit, which was 28/5. Subsequent examinations at appropriate intervals confirmed the patient's history of periodicity. A diagnosis of endometrioma was made and the nature of the tumour explained to the patient, who readily consented to its removal for histological study. Operation was performed at the Elizabeth Hospital, Prairie Grove, Ark., on March 10th, under general anæsthesia, to permit of direct inspection of the right inguinal canal and abdominal inguinal ring. These were seen to be normal, the incision was closed, and the tumour then removed through a separate incision into the labium. Recovery was uneventful, and there has been complete freedom from symptoms up to the present time. The truss has been abandoned.

The tumour was submitted to Dr. J. H. Fisher, professor of pathology in the University of Western Ontario, London, Canada, to whom we are indebted for his kind permission to publish his report, which is as follows: "Specimen is roughly spherical, measuring 2 cm. in diameter. The outer surface presents a roughened appearance with tags of fibrous and fatty tissue attached. On section the cut surface is firm, greyish-white, with darker points and small areas scattered through it. The sections show many dilated glands composed of tall columnar epithelium and surrounded by typical endometrial stroma. These glands strongly resemble those of the uterine endometrium. Most of them contain blood and fragmented granular material. The glandular structures are embedded in a rather dense fibrous tissue with a small amount of fat. "Pathological diagnosis: endometriosis."

We are, Sir, yours faithfully,

FRANK RIGGALL,
Prairie Grove, Arkansas, Dec. 23rd. CECIL RIGGALL.

TRANSIT OF PREGNANT WOMEN BY AIR

To the Editor of THE LANCET

SIR,—The question of the transit of pregnant women by aeroplanes has come up for consideration, and is one of importance to the medical profession as well as to the general public. Several factors are involved, such as the distance to be travelled and the facilities which exist for medical aid at the landing-grounds as well as the condition of the patient herself. The rules formulated would presumably differ for those flying within European limits from those flying across Africa or Asia or to Australia, and tentatively one might suggest a limit of one clear month from the expected date of delivery in the former and two months for the long-distance passengers. I should be grateful to members of the profession who would give their views on this question either in the columns of this journal or in private correspondence.

I am, Sir, yours faithfully,

F. P. MACKIE,
Colonel I.M.S. (retd.);
Feb. 12th. Medical Adviser, Imperial Airways Ltd.

HUNTERIAN FESTIVAL DINNER

THE biennial dinner of the Royal College of Surgeons of England was served in the library of the College on Feb. 15th under the happiest auspices. Immediately overhead was in progress the reconstruction of the three upper floors of the College to make a new and adequate institute of surgical research and incidentally completing Sir Charles Barry's beautiful façade. The company over which Sir CUTHBERT WALLACE presided included five Hunterian trustees, the treasurers of the four Inns of Court, eight masters of City Companies, and the medical directors of the three Defence Forces. Sir CHARLES GORDON-WATSON who toasted The Guests paid special attention to Lord Russell of Killowen and Sir Plunket Barton who were sitting by him, but the real guest of the evening was John Hunter whose memory was drunk in reverent silence.

"I like," said Sir Cuthbert, "to think about three characteristics of the man. First, there was his curiosity. This word is now perhaps of ill favour, but in its best sense it describes well Hunter's childlike desire to find out how things work, and caused him, if not to originate, to improve and amplify the experimental method. Secondly, there was his diligence. He was a whole-time worker, though not in the modern sense. Hunter had a large practice, the gain from which he devoted to paying for his researches. He was late and early in his workroom, and left himself but four hours for sleep. Then there was his courage when stricken with a terrifying disease. Hunter calmly continued his work and made himself an object of his own study."

And, having said this, Sir Cuthbert gave the welcome news that the Bernhard Baron trustees who had

"thought that the President's advisers were rather optimistic in their estimates of what they could achieve for the sum named," had decided to increase their gift of £30,000 by a further grant of £5000 in order "that your plans should be carried to complete fulfilment without financial anxiety." Sir ARTHUR MACNALTY who, in the absence of the Minister of Health, responded for the guests, spoke of Hunter as the man who had introduced the exercise of the observant scientific mind into the study and practice of surgery. He recalled that his predecessor Sir John Simon, the first chief medical officer of the central health department, was at the same time President of the College. His training in scientific surgery led him from the study of disease in the individual to the prevention of disease in the community. Living in more leisured times Simon worked for many years at Whitehall in the mornings while in the afternoons he operated or saw patients at St. Thomas's Hospital. The toast of the Hunterian Orator was proposed by Sir FARQUHAR BUZZARD with a warm tribute to Mr. Fagge's re-presentment of the great genius of John Hilton and a word about "the need to perpetuate in our profession the mind that was in Hunter."

On another page will be found some account of the special lecture given during the afternoon by Prof. G. E. GASK, who related unpublished facts about John Hunter's work in the campaign in Portugal, 1762–63, and of his life in a base hospital at Lisbon.

PUBLIC HEALTH

Four Years' Work at the Maudsley

Dr. Edward Mapother's report on work at the Maudsley Hospital during the period from January, 1932, to December, 1935, is a record of steady achievement and development. As an important teaching centre in psychological medicine, the hospital receives a large floating population of post-graduate and undergraduate students, to meet whose needs the plan of instruction has been modified by the formation of a teaching unit. Dr. Aubrey Lewis has been responsible for organising the unit, and has charge, with the help of three colleagues, of nearly half the beds, so as to include patients of both sexes and all types. The remainder of the beds are grouped under firms, as at most general hospitals. The hospital is now recognised as a school of the University of London; professorships in the university were recently conferred on Dr. Mapother and Dr. F. L. Golla, director of the Central Pathological Laboratory.

Enlargement of buildings has not only made possible the accommodation of more patients but has greatly improved the teaching capacity of the hospital. In addition to the increasing number of post-graduate students attending the D.P.M. course held each spring, medical officers from the L.C.C. mental hospitals are seconded to the Maudsley as clinical assistants for periods of six months at a time. Indeed, the report suggests that those entering the council's mental hospital service are now "provided with a series of opportunities for obtaining psychiatric education and experience which is probably unequalled elsewhere." Undergraduate teaching is carried on in Pantia Ralli ward of King's College Hospital, which has been loaned for a period of years as an annexe to the Maudsley Hospital.

In this report Dr. Mapother discusses the advantages of forming a neuropsychiatric unit, intended chiefly for research and teaching. Such a unit would have great value in the post-graduate training of psychiatrists, especially if it were possible to tap the rich supply of material in the general hospitals of the Council. Other developments suggested or foreshadowed in the report are that of building a hostel from which patients could go out to work even while attending the out-patient department—a solution for those whose chief need is removal from unhappy home conditions; and that, already approved, of providing accommodation for thirty children to be admitted under the children's department.

Health Indices

Chadwick in England and Shattuck in the U.S.A. based a novel campaign upon the proposition that the health of a community was dominated by environment; this being so, the health of a community should be capable of deduction from environmental data. John Billings, the great American army surgeon, was attracted to this idea of estimating the healthfulness of places, but he did not pursue the matter. In 1915 Dr. Charles V. Chapin, of Providence (R.I.), interested himself in comparing the health services of various local government units and introduced the "appraisal form," which enabled the available health services of various units to be evaluated from a score sheet. The objection to such a score sheet was that the marking is arbitrary, so the sheets of different assessors were not comparable; but they had some use in detecting improvement or the reverse in the total value of health services. In a recent review [1] Dr. K. Stouman and Dr. I. S. Falk, of New Haven (Conn.), have developed further this method of evaluating the health of communities. The "health indices" which they employ are made up of the appraisal form, "indices of vitality and health" (vital statistics), and "indices of environment," which give meteorological and social factors. A typical "short list" (which nevertheless contains 78 entries) is given from the city of New Haven, comparable with the statistical part of the annual report of a medical officer of health who puts in everything which might have a say in the health of the people.

The object of these health indices is to obtain statistics, standardised for as many functions as possible, in order to obtain material for working out the causes of disease; or, in other words, to obtain facts for biometry. The objection to them is that most of the information, though set down in mathematical form, has a specious accuracy which may be more misleading than rough guesswork. Where the information is reliable, use can be made of it in a less complicated manner. Hence, for practical purposes, "health indices" will not much attract health officers who have been trained in statistical epidemiology to the point of knowing its pitfalls. It would be possible for any medical officer with a large expenditure of labour, and without any research, to fill up the full score sheet of 100 indices for his district, but he would gain little from it which he did not know before, and he would find that it was precisely in those matters where his entries must be provisional or uncertain that he wants accurate information. On the other hand, given this full score sheet filled in by a reliable authority for Jericho, Timbuctoo, and Los Angeles, it would be possible to compare the health and services of the three towns, and indices so obtained might be valuable to the Health Organisation.

[1] *Quart. Bull. Hlth Org. L.o.N.* December, 1936, pp. 901-1081.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

BY A ROVER

III

It was not only on account of that lapse of memory, which my colleague had noticed, that I knew I had had influenza. Other things had happened which made it pretty certain that the fever of a fortnight ago was of this nature. On the side of the nervous system there was depression, and of a somewhat elaborate kind, not a mere feeling that life was not worth living but a change in my whole philosophy of life, which tended towards the positive, not merely the negative, aspects of pessimism. I slept a great deal but dreamed vividly, an almost new experience. Brain work which was largely mechanical I could tolerate, but an attempt at anything which required constructive thought was painful and doomed to failure.

* * *

Then there was evidence that the heart was "poisoned." The "effort syndrome" was definitely recognisable. I chose the lift (when available) rather than the stairs, even to reach the first floor—a practice I had hitherto scorned, both as a time-saving device and for exercise. I let the porters carry my bag; I didn't mind it being thought that I was getting on in years so I invited people to help me on with my overcoat; I walked more slowly than usual, even on the level. On one occasion I forgot and lifted the foot of a bed containing a pretty heavy woman whilst the nurse put blocks under the castors. I had a heart ache for two days afterwards. Two or three nights I woke with irregular action of the heart and, though my clinical sense told me the disturbance was of the nature of extra-systoles, my depression whispered gloomily about fibrillation, the indication for an E.C.G., and the propriety of suspending tobacco (which, in any case, gave much less satisfaction than usual) and coffee.

* * *

And, again, there was that tiresome cough, which seemed so meaningless, since there was no catarrh, and yet which was so greatly influenced by temperatures, effort, food, and posture.

But the fever itself could scarcely have been anything else than influenza. The epidemic was on, the onset was abrupt, I had one horrible night during which my mind threshed through the hours, trying vainly to link up paroxysms of a most painful tracheal bark with a dream-state from which I woke (as it seemed) dozens of times. (How true, despite the nurse's report, is that asseveration of our patients that they "haven't slept a wink all night.") What other disease, all said and done, the duration of the acute stage of which may be only 48 hours, can effect such a devastating change in the equilibrium of body and soul? We say that we have no criteria by which to judge what is influenza. Rubbish! An infection which produces all this disturbance, and yet may yield no "physical signs," *is* influenza. And it is not the work of a mere coccus or bacillus either.

* * *

The more we become familiar with diseases due to infection by filtrable viruses the more confirmed are we that the specific infection in influenza is of this nature. Some of us held this view strongly, even when B. Pfeiffer had such powerful adherents. Experience of psittacosis, for example, illumined the darkness considerably. Here we saw a combination of a typhoid-like state with a "spreading" form of pulmonary inflammation associated with bronchiolitis and œdema. In the 1918–19 epidemic of influenza, or rather amongst the more severe cases which occurred just before, and just after, the main wave of morbidity, we saw the typhoid-like cases both with, and without, pulmonary symptoms, and we also saw the pulmonary cases with their peculiar cyanosis, extensive congestion of the lung, and bloody sputum. The memory of my first case of fulminant respiratory influenza (in 1918) remains vividly in my mind, especially the peculiar cyanosis. The colour of the face reminded me of the only case of aniline poisoning I have ever seen—a medical student who got a shock when he saw his face in the mirror one morning. He had been applying an aniline preparation to an inflamed ear. But he wasn't ill. I couldn't "place" the young woman with the heliotrope face and the generalised bronchiolitis because I had neither seen such a case nor heard of it. How easy the diagnosis is to-day!

* * *

Measles is almost certainly another virus infection. Of all the common acute exanthemata it is the most likely to lead to serious nerve symptoms, such as encephalitis and myelitis.

I suppose it was some such inductive reasoning as this that led Sydenham to his conception of "epidemic constitutions"—that famous battleground between the bacteriologists and the epidemiologists. Hippocrates it was who started the idea, for he, like Sydenham, loved to generalise from particulars. For Sydenham it was the disease rather than the patient that possessed the "constitution." We are warned by some of those who are reluctant to let outworn notions die—when those notions were the product of the thought of great men—not to consider ideas that seem to us to be nonsense to-day to have been nonsense at the time they were uttered. The point is rather that these great men would, in the light of our present knowledge, throw overboard their own notions much more quickly and entirely than do their reverent but slavish disciples. Microbiology gives the answer to the riddle that faced all the physicians, however great their genius, down to the time of Pasteur. We are told that there may still be pearls to be had for the searching in the writings of Sydenham and those who followed him. But the pearls are surely the persistence of the man and his painstaking work in the face of the fact that the key to his difficulties was hidden from him and could not be revealed until new tools opened up new methods of inquiry. The same may be said of Hunter and of others whose genius came so near to finding the answer to the riddle. It is clear, from careful study of their writings, that they did not deceive themselves into believing that they had solved the essential problem inherent in most diseases—what *is* it that disturbs the equilibrium of the body and leads to that complex series of changes revealed in the study of the sick man? Pasteur and Lister and Koch, following Leeuwenhoek, gave the answer and the science of Infection was born.

PARLIAMENTARY INTELLIGENCE

THE FACTORIES BILL

ON Feb. 11th in the House of Commons Sir J. SIMON, Home Secretary, moved the second reading of the Factories Bill. He said it was 36 years since any comprehensive measure for amending our factory code was last enacted by Parliament. While, of course, some useful and important amendments and extensions of our factory law had been made since that time, for example in 1907 and 1916, and a very important change in 1920, and again in 1929, still the main factory code remained the code of 1901. It was therefore high time that a new and improved code was passed, not only consolidating but amending and improving the existing law. Both the National Confederation of Employers' Organisations and the General Council of the Trade Union Congress had been consulted before this Bill was drafted and while therefore there would be a number of points in Committee on which there were sure to be differences of view, he was justified in anticipating that on much of the Bill there would be found to be a very large measure of agreement.

The questions of health were dealt with in the Bill in Parts I, III, and IV. These provisions involved in many respects a real advance. The first clause was important in that it made more precise the present law by including specific provisions in regard to the removal of accumulations of dirt and the cleaning of floors, which in many factories needed very careful attention. In Clause 2 they dealt with the important question of overcrowding and the standard of air space to be allowed. They wanted in principle to secure an increase in air space from 250 cubic feet to 400 cubic feet, which was the standard existing to-day in the best-appointed factories. The difficulty was to get the change rapidly made in the smaller works in certain industries. Adequate ventilation was as important as adequate air space. The proviso in Clause 2 was designed to secure, if possible, that existing works should comply with the new standard as soon as possible, but they were to be given time to do it. In the meantime they emphasised the importance of effective mechanical ventilation being provided, if a room was crowded. The existing factory code made no provision for ensuring proper lighting. The lighting clause in this Bill was an entirely new provision. Important new powers were also conferred under Clause 11. At present there was no power to require medical supervision in a particular works to meet a special emergency. For example, suppose there was an outbreak of anthrax during some process, or dermatitis, or sepsis, or conjunctivitis. There was no power now in the factory code by which the medical officers of the Department could say that there must be an investigation to find out how these outbreaks had occurred. In the same way, there was no power at present to meet cases where there was reason to apprehend that some substance was being employed that was likely to be injurious, the injury being caused through the material, or through one of the materials used. Again, there was no power at present to secure proper investigation with a view to stopping the injury in cases where young persons were being put on work which it was thought might prove too much for them.

It was high time to provide in the factory code that in cases of that sort it should be the right of the authorities to introduce, if necessary, medical supervision with a view to discovering what was the explanation, to stop the cause if they could, and to throw light on what might be a very obscure cause of trouble. Clause 11 would give the Secretary of State power to require reasonable arrangements to be made for the medical supervision of the workers, or any class of workers, either in a particular factory, or in any class or description of occupation. Part III of the Bill dealt with welfare provisions. There were certain welfare provisions already in operation. One might say that welfare work was an outcome of the war. It was intended to extend and make much more precise the welfare provisions contained in the Act of 1916. The existing provisions for the removal of dust were not adequate and they wanted to make them much stronger; that was done in Clause 46. New provisions for the control of underground workrooms in factories were included in Clause 51. Clause 54 was an entirely new and important provision; it was designed to protect people in the matter of lifting weights which were too heavy for them. Clause 48 dealt with the romantic operation called "shuttle-kissing"—that was to say threading the shuttle by mouth suction. That must be an objectionable practice and it was desirable to discourage it, although the information of the Factory Department of the Home Office did not go to show very definitely that any particular disease was thereby developed.

It was an extraordinary thing that the earliest Factory Acts made no provision about safety. It was largely due to the earlier factory inspectors going about their work that effective attention was called to the dreadful accidents due to unfenced machinery. It was in 1844 that provision was first made for promoting safety in factories and such provision had been steadily extended. This Bill took advantage of later experience and tightened up the whole code. In 1924 there were 312 accidents due to unfenced shafting, of which 44 were fatal; and in 1934 there were 164 accidents, of which 21 were fatal. That illustration showed how much could be done if proper protective measures were taken. Accidents also occurred in connexion with tin rollers of ring spinning frames used in the cotton industry. In three years 1912–14 there were 52 such accidents; in 1913 the Home Office secured agreement about a definite standard of fencing for this machinery. The result was that this particular type of accident had been practically eliminated. In some years not one accident had been reported due to tin rollers. There were a great many other instances, such as accidents due to the failure of cranes, and accidents connected with electrical appliances, and he was satisfied that the tightening up of the regulations and rules on this subject would materially reduce accidents. The figures for accidents among juvenile workers showed a disturbing tendency to increase. In Clause 20 there were some important provisions which definitely prohibited young persons from cleaning what was called prime movers, which meant the sources of power, or transmission machinery in motion. Clause 15, which allowed access to unfenced machinery in certain circumstances, had the effect of prohibiting any person other than a male of over 18 from having anything to do with unfenced shafting. The Confederation of Employers had been induced to send out a circular to all the factories of the country calling attention to the disturbing feature of accidents to juveniles and embodying suggestions for reducing such accidents. The reports received by the Home Office showed that many firms were taking the action suggested, and it was important to watch the statistics to see how far these steps and the provisions in the new Bill resulted in the rate of juvenile accidents being reduced.

Taking the years 1924 and 1934, which were really comparable for this purpose, there was undoubtedly an improvement in the total number of accidents. In 1924 the total was 170,000, of which 956 were fatal. In 1934, when the numbers employed were about the same, the total was 136,800, of which 785 were fatal. If they took accidents connected with machinery, which was perhaps the most useful test, they found that they fell from 35,450 to 28,000, so that they could fairly say that the total accident rate had fallen in those ten years by about 20 per cent. In this Bill the Government proposed to introduce a

better system in regard to hours of work. They proposed to lay down for women and young persons that the maximum working week, the normal working week, should be 48 hours. They had to make some provision for overtime; but whereas under the existing law an employer could work a woman or young person for a period of overtime every week over and above the 48 hours—in the case of non-textile factories they could be worked for 12 hours overtime every week, a total of 624 hours' overtime in the year, and in the case of a textile factory they could be worked for the normal 48 hours and another 7½ hours in the week, or 390 hours' overtime in the year—it was now proposed to improve the law by limiting the amount of overtime substantially. As the Bill was drawn it provided that there might be as much as 100 hours of overtime, but they could only be worked in a limited number of weeks, he thought 30 in the year, and there could not be more than 6 hours in any given week. At present it was possible for women and young persons to work until 4 o'clock on Saturday afternoons. Under this Bill 1 o'clock on Saturdays would be the closing time as far as women and young persons were concerned.

Summing up the measure, Sir J. Simon said that what the Government were trying to do was to revise the industrial code which controlled the working life of some 7,000,000 men, women, and young persons. They were engaged in framing what, though it might not be a perfect scheme, would prove, he thought, an improved charter for their protection against accident and undue fatigue, and for promoting not only industrial health and safety, but greater industrial efficiency and prosperity. The general administration of the new law would be in the hands of an enlarged body of factory inspectors. At present they had not enough inspectors.

Mr. CLYNES said in many respects they could praise the provisions of the Bill, but their praise must be balanced by criticism and by some blame. He would describe the Bill as proposing to make a large number of small changes, but avoiding the great issues, and the big questions of factory reform. There was a real demand for a substantial reduction of hours and the demand had been internationally expressed. Lately in the House of Commons there had been insistence on Parliamentary action to secure improved standards of physique and sums of money were to be provided to that end. He (Mr. Clynes) preferred that problems of improved health standards and physique should be handled at the source. He would improve the conditions of employment, making them humane and lighter than much industrial work now was. Conditions in our factories and workshops did not assist fine physical development. He hoped in the Committee stage the Home Secretary would give a willing ear to appeals for the lowering of the hours of work. In the view of the Labour Party overtime ought to be more severely limited or abolished. The provisions in regard to overtime in the Bill were on the whole too generous to the employers and unjust to a large number especially of women workers. The Labour Party on the Committee stage would strongly resist overtime for young persons and women. He was a little disappointed that Sir J. Simon had failed to give any definite indication of the extent to which the number of factory inspectors was to be increased, for the whole value of this measure would depend on the watchfulness and supervision and activities of the factory inspectorate. A serious omission from the Bill was that no proper rest in the year was secured for the average worker by means of holidays. The Labour Opposition approved the general purpose of the Bill and accepted it as being in principle something that had been too long delayed.

Viscountess ASTOR said that in many ways this was a splendid Bill, but it was their duty to help the Government to make it an even better one. Sixteen per cent. of the children who entered our elementary schools were physically defective and they were going to be allowed to go into factories at 16 and to work a 48 hour week with overtime. She did not think that they would get the blessings of the factory inspectors for juveniles who worked nine hours a day under modern conditions. Many people objected to women in industry being classed with children; it was perfectly absurd. If women were of a certain age and strength and wanted to work overtime in the same way as men she did not see why they should not do so, but she objected to young persons up to 18 being worked overtime. These children got tired and then accidents happened. She hoped that the Government would agree in Committee to limit the hours to 40 per week. The amount of gross overwork imposed on young persons was incredible in these days. If we were to stop the falling birth-rate and be an A1 nation we must protect our young peoples. The time was ripe for raising the age for the entry of children into factories to 15.

Mr. MANDER said the Liberal Party would support the second reading of the Bill. The measure, however, was by no means heroic; it needed strengthening while showing a substantial advance in many directions the Bill indicated a retreat in certain directions. It was deplorable after the Washington Convention that the Government had not taken this opportunity of amending the law in regard to the hours of work for men. The question of working hours was a health question; long hours of work affected men just as they affected women. He hoped that they would be able to improve the Bill in Committee.

After further debate,

Mr. SHORT said that since 1918 we had just tinkered with this problem. We were lagging considerably behind other countries so far as many labour laws were concerned. This Bill was stamped on almost every page with the word "compromise"—compromise with the employers, but not with the workers; compromise with vested interests, but not with humanity. He could not regard the Bill as a great reform. It was not a great charter, but a disappointing measure. But though he was critical of what he considered to be the failing of the Government in this Bill to deal with the bigger issues, that did not mean that the Labour Opposition would not coöperate actively to ensure that the measure was improved in Committee.

Mr. WEDDERBURN, Under-Secretary of State for Scotland, said that the Government were grateful for the generally favourable reception which had been given to the Bill. As to the question of the 40-hours' week, it had never been the purpose of factory legislation in this country to go beyond the limits of what was considered necessary to ensure the safety and the health of the workers in the factories. Factory legislation here had never dealt with measures which could only be justified on general social and economic grounds, as for example, the extension of leisure beyond that minimum which was necessary for health and safety. A Minimum Hours Bill would be part of the policy of the Minister of Labour and would not be relevant to the functions of the Home Office. He hoped that the House would not think that the Government anticipated that the maximum hours of overtime permitted by the Bill were likely to be normal. The Bill did a great deal to restrict the overtime which was allowed by our present law. The question of annual holidays with pay was inevitably connected with rates of pay and remuneration and it would therefore be outside the scope of the Factory Acts. The Government quite appreciated and shared the general desire that working conditions generally should be in advance of the minimum requirements laid down in this Bill, but it was not the function of legislation to prescribe compulsorily what was regarded as the optimum standard. It was the purpose of legislation to ensure that the conditions which were decided on, and which were approved by public opinion and settled by the great majority of workers and employers, should not be

vitiated or taken advantage of by a minority who did not choose to recognise these generally accepted standards and attempted to derive advantage for themselves by refusing to observe them.

THE MINISTER OF HEALTH

The debate was resumed on Feb. 15th when Sir KINGSLEY WOOD commended the Bill to the House because he said many of its provisions embodied that advance in national health policy which was rightly occupying so much attention to-day. Whilst it was right to continue efforts to cure illness and physical defects, more should be done to prevent them. Many people looked forward to the time when doctors would be paid when people were well, and fined when they were ill. There was no doubt that incapacitating sickness and accidents in industry were still heavy, and much of it was avoidable. "Public Enemy No. 1" was colds and influenza, which accounted for about 25 per cent. of absences from work. The medical profession had not yet found an instant remedy for these. Some of the best safeguards against disease and illness, especially of a minor sort, were, in addition to shorter hours and longer holidays, good housing, airy schools, good food, clean streets, and open spaces. But the efforts could not stop short outside the factory door, and much could be done in promoting the health of the working population by more medical supervision and more welfare provisions.

The need of further statutory provision for the lighting of factories was clearly established, for conditions in many places were far from satisfactory. Clause 5 of the Bill provided that there should be suitable and proper lighting in every factory and for every part of the factory. The Home Secretary would have power to define by order what was adequate and suitable illumination for factories or processes, and certain minimum standards would be laid down.

Under Clause 11 there was an important development towards assisting preventive medicine. Under the existing Act there was power to require medical examinations as a permanent arrangement in codes of regulations for dangerous trades; but it would be of great value to employers and workers that arrangements for medical supervision could be made from time to time in particular works and in certain circumstances. He had in mind cases where there might be an outbreak of dermatitis where irritating substances were being used, or where there had been an introduction of new chemicals likely to be injurious to the workers, or where an outbreak of anthrax was suspected. In such cases the Home Secretary could make special regulations requiring reasonable arrangements to be made for medical supervision of the health of the people so employed. This would be a useful provision for protecting the health of the workers and for reducing short time. The Home Secretary would also be able to make special arrangements requiring reasonable medical supervision of young persons who might be employed on work that might cause risk of injury to their health. Some of the welfare provisions in Clause 8 should also have an important bearing on the general health of the workers. There was to be suitable accommodation for workers' clothing, with arrangements for drying wet clothes. He also attached importance to the facilities laid down for the seating of women, in preventing excessive fatigue and ill-health. Clause 46 made an important modification of the law with regard to the prevention of injurious affections of the lungs. The new provisions required workers to be protected not only against the breathing of dust or fumes of an injurious or offensive character, as under the present law, but also against the breathing of any kind of dust to a substantial extent.

The suggestion that the Bill should prohibit the employment of women in factories during the last six or eight weeks of pregnancy raised a matter of great difficulty and complexity. The British Medical Association had put forward certain views on the matter, but the Association's memorandum said there seemed no valid reason why a pregnant woman should not perform some work of a suitable nature up to the last week or two of pregnancy, and that it would be a hardship if cessation of factory work were to be made compulsory. One of the difficulties was that if it were to be made a penal offence for a woman to be employed in a factory for a stated period before confinement, it would be quite impracticable to penalise the employer and the penalty would have to be imposed on the woman herself. Then there arose the question of who was to determine the period of pregnancy. A good many women would resent a compulsory prohibition of the kind suggested, and it must be asked whether such a prohibition might not have a bad effect by discouraging a woman from availing herself of antenatal services at an early stage of pregnancy.

The Bill also proposed, by amendment of the law and by administrative action, to improve the medical arrangements for the examination of young persons by the certifying surgeon. The certifying surgeon would in future be required to give a positive certificate that the young person was fit for employment, and not merely the negative certificate that he was not unfit. Steps were also being taken to ensure a greater measure of coördination of the various State health services. The Bill made the important provision that Education Authorities should supply the school medical history to the certifying surgeon. By that means, the surgeon would have before him the whole medical history of the person being examined. On behalf of the local authorities he (Sir Kingsley Wood) could say that they were anxious to coöperate in the efficient enforcement of the provisions entrusted to them by the Bill. The Bill would mean a great betterment in the health and conditions of many millions of industrial workers.

MEDICAL VIEWS

Sir F. FREMANTLE said that from his considerable experience of inspecting factories in this country they were usually speaking temples of health. It seemed to him that they were on the line of general steady progress in this matter. He hoped that the Government's proposals for physical recreation would be a complement to the provisions for increased leisure, though he did not believe that long hours were necessarily detrimental to health. Monotony, too, had been found in certain circumstances to be preferred by the workers, because it involved less mental concentration. Sir Kingsley Wood had referred to the control of ventilation and temperature in factories, but he had forgotten two other essentials to comfort—the humidity and the movement of the air. The katathermometer, which showed the effect of these, was not yet generally used in the factory system. An advance had been made in the appointment by the Home Office of certifying factory surgeons responsible to them and not to the educational or sanitary authorities. For these the title examining surgeon was very suitable. A medical officer was needed whose job it was to study the health conditions all the way through the factory and to make suggestions about the worker, the conditions of the factory, or the processes as far as they affected health. The difficulty in employing local medical officers on the grounds that secret processes had to be guarded from competitors ought to be overcome. Properly appointed officials would never be guilty of revealing secrets of any kind. There ought to be a much closer connexion between the factory medical officers of the Home Office and the local medical officers of the health and educational authorities than was aspired to in this Bill. Under the Bill a dossier from the schools was to be passed on to the examining surgeon who would examine the children going into industry and that was a good provision. Though he had suggested that the medical officer who had been examining the child during the whole of his or her school life was the best qualified to decide whether the child

was fitted for factory life. He regarded this Bill as only a temporary measure while they were thinking out a way of improving the general liaison of the health services. Industrial medicine had become vitally important to industry and to the health of the nation and must be under specially trained medical officers. Hitherto industrial medicine had been entirely left out of the general education of the medical man, but there was growing up a generation which was studying this question. He was afraid, however, that the ordinary medical men in the country were not being properly trained for what he believed would be the duties which would be cast upon them in the future.

Sir ERNEST GRAHAM-LITTLE urged that a larger measure of medical supervision should be provided under the Bill. He did not think that there was any medical reason why they should differentiate between men and women in the Bill; he would like the division simply to be between adults and adolescents, the latter, of course, requiring some age qualification. Special measures might be called for on account of age, but not, he submitted, of sex, with one exception, that of pregnancy. Pregnancy ought to be regarded as in the nature of an illness and treated according to the individual case. They ought to legislate with some attention to basic facts. He would plead for much better medical service in factories. The chief inspector of factories made a very impressive statement in 1932 when he said that they had come to the limit of usefulness in devising gadgets to prevent accidents and more consideration should be given to the personal factor. That was borne out by statistics. One could predict that a certain group of persons would have accidents. It was the same in cases of idiosyncrasy. Out of the total number of disabilities which caused absence from work in factories, practically one-half were due to external irritants and disease of the skin. By far the most important industrial accident or disease was cancer, which was on the increase all the time, and it was not notifiable. In the last three years there were 535 cases and 123 deaths. The cases of cancer referred to in these reports arose from two causes—oil and tar. Oil, of course, was the lubricant used in the cotton industry and it was the cause of an extraordinary large mortality. In the last report of the Registrar-General the figure for the mortality from cancer produced by oil was 4 per 1,000,000 of the ordinary population, but among cotton spinners it was 134 per 1,000,000. It had been ascertained that the production of the disease by oil depended upon the nature of the oil—the heavier the oil the more cancer it produced; and experiments which had been tried in Manchester chiefly showed that these oils could be identified and that it was possible to determine beforehand what would happen if a certain oil was used. A formula was now available which could be very easily applied and by which it was possible to determine before a particular oil was used what was likely to result from its use in the matter of cancer production and the injury to the skin caused thereby. Although that information had been quoted in the medical press for the last three or four years, he saw no mention of it in any of the factory inspectors' reports. This information had been passed on to the body which dealt chiefly with petroleum manufacture. The incidence of cancer caused by tar was 4 per 1,000,000 of the general population, but in the case of tar workers it was 695 per 1,000,000 and in the case of chimney-sweeps, who were subject to somewhat similar conditions, it was 534 per 1,000,000. The opportunity afforded by this Bill to increase the amount of medical supervision should not be lost. Medical supervision should be provided for all workers, irrespective of age or sex.

UNDER-SECRETARY'S REPLY

After further debate, Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replying to the debate, said that the provisions in the Bill in regard to medical supervision gave an important new power. It enabled the Home Secretary in several circumstances to see that there was undertaken proper medical supervision on certain processes. He (Mr. Lloyd) would give the House an illustration as to how useful such a power would be. Fortunately they had one or two examples where medical supervision had taken place not compulsorily, but voluntarily. A few years ago there were developments in some of the factories making accumulators for motor-cars which led to an increase in lead poisoning. They had a considerable number of cases—over 100 in one year—and being progressive they approached the Home Office which arranged that there should be medical supervision in these works. A young doctor was put in charge of the work and he went into it very scientifically. Immediately there was the slightest indication of lead in the body the man was either taken off the work in which lead was used, or a radical alteration was made in the processes from the point of view of the elimination of lead. Owing to the measures that were taken the cases of lead poisoning dropped rapidly and during the last three or four years there had been in one factory only one or two cases at most, and in the others none.

The Bill was read a second time without a division.

The financial resolution in connexion with the Bill was agreed to in Committee.

THE TREND OF POPULATION

A Dangerous Decline

In the House of Commons on Feb. 10th Mr. CARTLAND moved:—

That this House is of opinion that the tendency of the population to decline may well constitute a danger to the maintenance of the British Empire and to the economic well-being of the nation, and requests His Majesty's Government to institute an inquiry into and report upon the problem and its social and economic consequences and to make recommendations in regard thereto.

He said that this problem was not merely political and social, but it also affected medicine, psychology, economics, and morals. From expert estimates of the future population it would be possible to draw a picture of this country in a hundred years time with derelict villages, silent factories, empty schools, and with only perhaps the hospitals and almshouses filled.

This problem was not only one of the future; it had risen to-day, and three facts were incontrovertible. The birth-rate had been falling steadily and consistently since 1875; and within three years the number of births for the first time would no longer exceed the deaths. Secondly, even if every child born to-day were to live to maturity, the birth-rate would still not be high enough to maintain the population at the present level; there were not sufficient females being born to replace the mothers. Thirdly a serious alteration had taken place in the age of the nation; the youth dwindling and the aged increasing in proportion. Would the programme and policy that the country was putting into operation to-day relieve or aggravate these circumstances? The spread of birth-control methods was not the sole explanation of the decline because it did not answer the question why those methods were being used. The whole tendency of modern life was towards small families, and too often the standard of life had become a standard of luxury, but he did not believe that even that was absolutely incompatible with an increased family. While national economic circumstances had affected to some extent the fluctuations of the birth-rate, they had never affected its trend. Another serious matter was the growing number of females and juveniles employed in modern industry. What was going to happen when the stream of these became a mere trickle? The death-rate had been pretty steady since 1910 and could hardly be lowered appreciably, and even through the maternity services the trend would not be reversed.

That had been going in the same direction since 1875. The nation was on the edge of an abyss. There was still time to climb back, but the situation was very dangerous.

Mr. SANDYS seconded the motion. He said that the problem of declining population was not confined to this country, but concerned Europe, the United States and the British Dominions. In China and India the population was slowly increasing and it was estimated that in Russia it would be doubled to some 320,000,000 before there was any likelihood of a decline. It was true that the population in this country was still growing because of the remarkable decline in the death-rate, which had fallen from 22 in 1871 to 11 in 1935, though the birth-rate had halved itself in that time. Very little difference had been made, however, in the expectation of life of adults, for in a man of 65 it had increased since 1871 only by some nine months. The change had been in the extremely satisfactory decline in infant mortality, the deaths in the first year having fallen from one in seven live births in 1886 to one in twenty in 1935, but further improvement was still necessary. The decline in our population, however, could never be arrested merely by continued reduction in infant mortality. He went on to quote forecasts of the future population showing how, if present tendencies were maintained, in sixty years' time 64 per cent. of the women in this country would be beyond the child-bearing age; and how the population of England and Wales would in a hundred years have dwindled to a mere 4,500,000. By 1976 children under fifteen would have changed from 10,000,000 to 4,000,000; people over 65 from 3,000,000 to 6,000,000; and the age-group 15–45—with the bulk of the nation's workers—from 21,000,000 to 12,000,000. As a remedy there were two alternatives open—to forbid birth control by making it illegal, which he thought would be a retrograde step, or so to alter social and economic conditions as to make people want to have large families, a course which would commend itself to all. They were asking for an inquiry to be held and action taken at the very earliest possible moment. If the present tendency was allowed to continue unchecked action that to-day would suffice to remedy the entire situation would in ten years be totally inadequate.

Mr. PARKER said that a marriage bounty policy was not likely to cure the population problem in this country. The first thing was to convince people that to maintain the race was of itself desirable. Secondly, it had to be made worth their while to do so by providing better maternity services and proper nutrition, care, and education of children, and a certainty of a job when they grew up. And thirdly, and most important, the danger of war had to be eliminated.

Mr. R. ACLAND believed that it would be wholly improper to oppose birth control. Other nations had tried that wholly without effect. He urged that birth control clinics, or rather children's clinics, should be encouraged, for otherwise unhealthy methods might be exploited. The first work of the committee of inquiry, which he hoped the Government would appoint, ought to be to investigate the different causes of childlessness. He thought the fear of pain and maternal mortality were important factors as well as the whole economic and political environment.

Sir FRANCIS FREMANTLE said that long before contraceptive methods were introduced the decline had begun. It was not merely one in quantity but in quality, for as he looked back on the large families he had known it was not the eldest but the younger sons who had taken the highest places in their careers. Therefore, by a continued decline in the birth-rate an immense amount of quality and ability would be lost. This country was thus losing the power to compete with other countries. He asked the House to remember the great labours in 1913 of the National Birth Rate Commission, under Bishop Boyd-Carpenter and its valuable reports in 1916 and 1918. He thought that the time was ripe for a further overhauling inquiry, and although they could not expect a very great deal from it.

After further debate, Mr. HUDSON, Parliamentary Secretary to the Ministry of Health, said that the Government proposed to accept the motion before the House and to make or, rather, to continue their investigation. Some hon. Members in the debate had painted appalling pictures of the steadily declining birth-rate. The interesting fact was that since 1933 for the first time in history it had remained stable in this country for four years in succession. Mr. Cartland quite rightly saw that contraceptive methods were the means and not the cause of the decline—an important distinction. It was very difficult to reach any considered opinion on this problem with the information at present at their disposal. A very large preponderance of persons in the prime of life at present was due to an excess of births at one time which must inevitably be followed by an excess of an older age-group. The juvenile population to-day sprang from years with a low birth-rate and the number of old people was the result of an earlier time—and this was the reason for this enormous bulge in the centre age-groups. He thought the estimates of the future that were being made to-day by certain statisticians were possibly as wide of the mark as those that were made a hundred years ago, with the knowledge they then had of the trend of population. The Government welcomed this debate, and proposed to intensify the inquiry which was continuously taking place. It was clear that this intense investigation might lead to interesting conclusions. They hoped to obtain sufficient information to indicate what their policy should be.

The motion was agreed to.

INSANITY AND DIVORCE: NEW SCOTTISH BILL

In the House of Lords, on Feb. 11th, Lord ALNESS moved the Second Reading of the Divorce (Scotland) Bill, which extends the grounds on which decrees for divorce may be granted in Scotland. He said that the first ground for divorce in the Bill was that of desertion and the second insanity. The period provided by the Bill during which the insanity must subsist was three years. The majority report of the Royal Commission held that insanity (1) defeated the purpose of the marriage relationship; (2) made marriage as a contract impossible of fulfilment; (3) lay outside the reasonable contemplation of the parties at the date of the marriage; and (4) differing from all other bodily disorders involved the removal of the insane person and so brought to an end every phase of marriage. Some of the most tragic cases in social life had occurred in consequence of this supervening malady. The first of two objections that had been taken to insanity as a ground for divorce was that the afflicted person might recover. The evidence before the Royal Commission established that after five years the cases of recovery were only 1 per cent., and after three years a very slightly higher rate. Moreover, in these rare cases of insanity it was surely, eugenically and otherwise, undesirable that the parties should resume cohabitation and should breed. Insanity might recur at any moment. Again, it was objected that lunacy was a misfortune, not a fault. That was true, but, divorce decrees were not given as punishments. There were in Scotland 20,000 insane persons confined in asylums. The Board of Control had not been able to provide him with the precise figures of those who were married, but it could not be disputed that there were at any rate thousands. The evil was therefore widespread. It was important to recall that divorce on the ground of insanity was the law in New Zealand. Scandinavia, Czecho-Slovakia, and Portugal. The late Lord Birkenhead had stigmatised the present system as savage in conception and devastating in its consequences. The change proposed in the Bill was one

hat was in obedience to the profoundest considerations of social policy.

Other grounds for divorce under the Bill were cruelty; penal servitude, after a sentence to that effect or a commuted death sentence; conviction three times of a crime since the marriage and within 5 years of the raising of an action of divorce, and sentence of imprisonment for not less than 6 months, the crime involving either dishonesty or personal violence; and habitual drunkenness.

Lord MACMILLAN, in supporting the Bill, said that although lunacy had not hitherto been a ground for divorce in Scotland, it had commended itself to the Royal Commission.

Lord STRATHCONA said at that stage he could not express either approval or disapproval of the principles of the Bill. It must rest with their Lordships to decide according to their convictions.

The Bill was read a second time.

Cruel Films

In the House of Commons on Feb. 11th, Sir ROBERT GOWER presented the Cinematograph Films (Animals) Bill, a measure to prohibit the production or exhibition of films depicting suffering to animals or in the production of which suffering may have been caused to animals. The Bill was read a first time.

QUESTION TIME

THURSDAY, FEB. 11TH

Unemployed Men at Papworth Settlement

Mr. ROWSON asked the Minister of Labour if he was aware that young men from the distressed areas and from Government training centres who were not suffering from tuberculosis themselves were being employed in Papworth workshops, Cambridgeshire, and were working side by side with persons suffering from tuberculosis; and if he would consider the advisability of discontinuing this practice.—Mr. ERNEST BROWN replied: Yes, Sir. I understand that 24 men who were trained at Government training centres, as well as a considerably larger number of other non-tuberculous men, are at present employed at the Papworth Village Centre. These men were informed before they took up employment at Papworth that they would be working in a settlement for tuberculous persons, and recruitment is on a voluntary basis. My right hon. friend, the Minister of Health, will deal more fully with the medical aspect of the matter in reply to a later question, but I understand that there is no special risk of infection, and, in these circumstances, I do not feel justified in refraining from giving suitable men from the training centres the opportunity of taking up employment at Papworth if they so wish.

Mr. ROWSON: Is the right hon. gentleman aware that the men claim that they have been deceived into going to Papworth and would like to get away as early as possible and they have been told that they will not be discharged and that they dare not leave on their own?—Mr. BROWN: I am not aware of that. The work that is going on at Papworth is a valuable and wonderful experiment.

Mr. TINKER: Might not the fact that they work in these surroundings make them feel that it has some influence on their health?—Mr. BROWN: That question does not arise.

Mr. SHINWELL: Cannot the Government devise more suitable schemes for training men than those in which the men run some risk of infection?—Mr. BROWN: I have answered the question on the Paper.—Mr. SHINWELL: Would the right hon. gentleman answer the questions a little more clearly?

Sir FRANCIS FREMANTLE: Is it not a fact that every precaution, practically speaking, is taken at Papworth, and that there is practically no risk in these people working side by side with one another?

Mr. ROWSON then asked the Minister of Health if he was aware that young men from the distressed areas and from Government training centres who were not suffering from tuberculosis were being employed in Papworth workshops, Cambridgeshire, and were working side by side with persons suffering from tuberculosis; and if he had obtained the opinion of his medical experts as to whether or not this practice, from a health point of view, was desirable and should be allowed to continue.—Sir KINGSLEY WOOD replied: Yes, Sir. These young men work in hygienic workshops and also in the open air. They are aware before they come that they will be employed in a tuberculosis village settlement. They do not reside there. The tuberculous patients are under constant medical supervision and are trained in the necessary precautions to guard against conveyance of infection. Under these circumstances, I am advised that no special risk is involved.

Mr. ROWSON: Is not the sole purpose of setting up tuberculosis sanatoria the prevention of infection and contagion, and if that is the case what is the use of sending tuberculous cases there and putting non-T.B. men side by side with them on the same bench?—Sir K. WOOD: I do not think there can be any objection. These men go quite voluntarily, and as far as any risk is concerned they are just in the same position as the medical staff and the nurses and other people associated with them.

Mr. ROWSON: If this is not regarded as a tuberculosis colony now, is it regarded as an ordinary commercial institution competing with other businesses of a similar character on the basis of cheap labour?—Sir K. WOOD: No, Sir. My opinion, as the hon Member has asked for it, is that this is an excellent institution doing a fine piece of work.

Mr. MABANE: Are not these questions calculated to damage the sale of admirable goods manufactured at Papworth workshops, which are in a perfectly hygienic condition and are rendering a great service to disabled men?

Alleged Press Persecution

Sir ASSHETON POWNALL asked the Home Secretary whether he had now heard from the Newspaper Proprietors' Association and the Newspaper Society in answer to his recent communication to them with regard to recent complaints against certain press representatives.—Mr. LLOYD replied: My right hon. friend has received communications on this subject from the Newspaper Society, the Press Association, Limited, and Reuter's forwarding resolutions passed by these bodies. The Newspaper Proprietors' Association informed my right hon. friend in a letter dated Feb. 4th that the Association have decided to appoint a committee "to investigate and recommend any steps which may be necessary to secure the end in view."

Replying to Lieut-Commander FLETCHER, who asked if the Home Secretary was contemplating any action in the matter, Mr. LLOYD said no doubt his right hon. friend would wish to consider the replies he had received from the associations concerned.

Protection of the Public against Air Raids

Sir NICHOLAS GRATTAN-DOYLE asked the Home Secretary what steps he proposed to take for the protection of the public in those areas in which the local authority had refused or failed to take precautionary action against the effect of air-raids.—Mr. LLOYD replied: These areas will share in the benefit of general precautionary measures taken by the Government, but this will not compensate for the future of any district, which is liable to attack, to take effective measures on its own account, and I trust that all local authorities will see their way to coöperate with the Government in this matter. I am glad to take this opportunity to say that the number of local authorities who are not coöperating is now seven and not eight as indicated in my reply on Jan. 25th as the Borough of Ilkeston is prepared to assist in the preparation of protective schemes.

Bogus Charities

Sir NICHOLAS GRATTAN-DOYLE asked the Home Secretary whether his attention had been called to the growth of bogus charities and house-to-house collections; and whether, with a view to removing these frauds on the public, he would introduce legislation for the compulsory registration of collecting charities, as had been done in the case of war charities and of charities for the blind.—Mr. LLOYD replied: My right hon. friend has received complaints from time to time of the activities of doubtful charities, especially of some which make house to house

collections. The compulsory registration of collecting charities was carefully considered by a Departmental Committee which reported in 1927, but the Committee decided not to recommend the institution of such a system. Legislation introduced in 1929 to implement recommendations of this Committee for an alternative measure of control failed to pass into law, and my right hon. friend cannot hold out any hope of fresh Government legislation on the subject.

Extensions to Southmead Hospital, Bristol

Mr. KELLY asked the Minister of Health what was the area of the land recently purchased for £11,500 from the Bishops Monk Horsfield estate trustees by the Bristol Corporation for extensions to Southmead Hospital; what number of patients the extension to the hospital was likely to accommodate; and whether the land in question was formerly agricultural and therefore exempt from local taxation.—Sir KINGSLEY WOOD replied: I am informed that the area of the land at Southmead Hospital which the Bristol Corporation have agreed to purchase, subject to my consent to the necessary loan, is about 24 acres, and that the extensions at present proposed by the Corporation include the provision of 100 beds for patients. The answer to the last part of the question is in the affirmative.

Experiment with Sub-Standard Recruits

Mr. DAVIDSON asked the Secretary of State for War the total weekly cost, per head, involved in the recent experiment to bring recruits, previously declared unfit, up to military physical standards.—Sir V. WARRENDER, Financial Secretary to the War Office, replied: The extra cost over and above that of a normal recruit was 3*s.* 2½*d.* a week for each man. This does not take into account the overhead expenses which, although not appreciable in respect of the small numbers involved, would be considerable if the experiment were applied on a large scale.

List of Approved Societies

Sir ARNOLD WILSON asked the Minister of Health whether he was aware that the last-published list of approved societies related to the year 1930; and whether he would consider issuing it annually in future as a Parliamentary paper available to members free on application and not, as at present, on payment.—Sir KINGSLEY WOOD replied: A new list of approved societies is already in course of preparation. It has not been found necessary to issue this list at intervals of less than five years as the changes from year to year are relatively unimportant.

TUESDAY, FEB. 16TH

Public Health Law in Scotland

Mr. WESTWOOD asked the Secretary of State for Scotland if he was aware of the desire amongst local authorities in Scotland for the consolidation of Local Government Statute Law relating to public health; and what action he proposed to give effect to the desires of the local authorities.—Mr. ELLIOT replied: I am aware that Scottish local authorities have expressed the desire for the consolidation of the law relating to public health. I have every sympathy with their views and I am keeping the matter before me in my consideration of the report of the Committee on Scottish Health Services.

Vagrants and "Red Biddy" Drinking in Scotland

Mr. WESTWOOD asked the Secretary of State for Scotland if he had had time to study the report of the departmental committee on vagrancy in Scotland, particularly Chapter III, paragraph 28, which dealt with the methylated spirit and Red Biddy drinkers and the addicts to even worse concoctions; if he had considered the recommendations contained in Chapter XII, paragraph 152, for dealing with these addicts; and, if so, what action, if any, was proposed to give effect to the recommendations.—Mr. ELLIOT replied: The report is under consideration. As stated in the report, the drinking of methylated spirits, Red Biddy, and other such concoctions is not confined to vagrants. The recommendation in paragraph 152 that vagrants addicted to such practices should be compulsorily detained raises a very wide question which requires careful consideration.

A NEW FORM OF U-V LIGHT METER

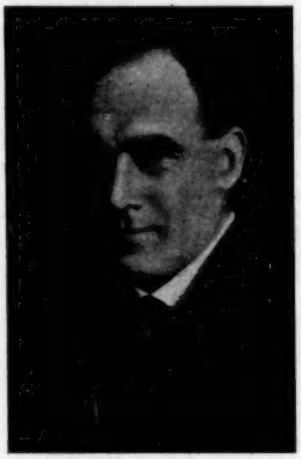
Mr. J. R. Ashworth, D.Sc., of Rochdale, has devised an instrument for measuring the ultra-violet rays of the atmosphere, using a wedge of wire gauze. The instrument is contained in a metal box 6¾ × 3¼ × 1¼ in., in the lid of which is a sheet of glass opaque to visible rays but permitting rays between 3000 and 4000 Angstrom units to pass. Beneath the glass is the wedge, lying in a tray which has 12 holes corresponding to 12 steps of the wedge; the tray covers a piece of sensitive photographic paper. The thick end of the wedge is nearly opaque to the rays whilst they print themselves strongly at the thin end, the intensity of the rays being measured by the number of printed spots to be seen on the paper. The proper qualities for a wedge are these: it must be transparent to U-V rays and of a material able to withstand for an indefinite time exposure to strong light, variations of temperature, moisture, and other external influences; it must be reasonably accurate step by step; and it must be capable of being reproduced exactly and with facility. These conditions are fulfilled by using wire gauze. The wedge is built up by placing over the first layer of wire gauze another layer one step shorter, over this again another one step shorter than the last, and so on. It follows from the mode in which the wedge is constructed that if the fraction of the rays which passes one layer is f, then that which passes the second superposed layer is f^2, and that through the nth layer is f^n; hence the logarithm of the intensity is proportional to the number of spots observed on the sensitive paper, and the ratio of one step to the next is the same at any part of the scale. The increase of intensity which each step represents is such that about 20 steps include the extremes likely to be met with. An instrument made on these lines may be had from Messrs. Negretti and Zambra. A table of intensities corresponding to any given number of spots is supplied with the instrument and no calculations have to be made when the instrument is in use. The spots are read in a good light as soon as the paper is taken out of the meter and no chemical treatment or washing is required. If the intensity of the ultra-violet rays is very great the twelve steps of the wedge may be insufficient for its registration, but by superposing on the wedge extra layers of wire gauze, of the same mesh as in the wedge, the range of the meter may be extended to any suitable degree. The instrument is designed to receive rays from the sky covering an angle of 45° around the zenith when the surface of the glass is in a horizontal plane. Daily observations are recommended, but the effects on the sensitive paper are cumulative and several days' exposure will give a reading equivalent to the sum of the separate days. Photographic paper of appropriate sensitivity is supplied with the meter and can always be repeated of the same standard. The instrument is strongly constructed and will stand prolonged exposure to hot or cold or wet weather without deterioration. The Department of Scientific and Industrial Research has reported favourably upon it and the instrument is now in use at Southport, Salford, Rochdale, and other places.

GLASGOW ROYAL INFIRMARY.—The cost of building the new nurses' home at this hospital is, it is stated, to be met by a contribution from the Lipton Trust and will form a memorial to Sir Thomas Lipton. The home is to be built in Cathedral-square and is expected to cost over £100,000. The chairman pointed out that if the recommendations of the Scottish Health Services Committee were adopted they would carry the voluntary hospitals into close coöperation with the local authorities. "We would welcome coöperation but as business men and good citizens we dread the waste caused by competition in this important field of public service." The ordinary expenditure of the Royal Infirmary last year was £118,424, which excluded capital expenditure.

OBITUARY

THEODORE HARTMANN JUST, M.B. Camb., F.R.C.S. Eng.

Theodore Just, who died on Feb. 13th after a prolonged and distressing illness, will be widely missed, and St. Bartholomew's men, past and present, have special cause to mourn the loss of a friend whose virile enthusiasm in work and play made him a prominent figure in hospital life. Born in 1886, he was the only son of Sir Hartmann Just, K.C.M.G., C.B., of the Colonial Office. He was educated at St. Paul's where he gained both academic and athletic distinction. He was capitation scholar, foundationer, Smee prizeman, and John Watson prizeman. He was in the Rugby football fifteen for three years, being captain in 1904; he rowed in the school four and he won the athletic challenge cup in 1904 and 1905. It was during his time at St. Paul's that Just first became known to his friends as "Father," an affectionate nickname which has stuck to him throughout his career.



[Photograph by Hay Wrightson

MR. JUST

From school he went to Trinity College, Cambridge, with an exhibition, and took a first in the natural sciences tripos; thence to St. Bartholomew's Hospital, where even in his early days as dresser to Sir Anthony Bowlby he was marked as a man of outstanding ability as well as keenness. He qualified M.B., B.Chir. in 1912, became Sir Anthony's house surgeon and as such displayed the enthusiastic and untiring devotion that was to distinguish his subsequent professional activities. Then as later it was common for him to spend the whole night by the bedside of an ill patient watching for the moment when surgical intervention might be essential. A further period as house surgeon, this time to the throat, nose, and ear department, brought him under the influence of Mr. Douglas Harmer, who stimulated in him a lasting interest in this branch of surgery. Before he specialised, however, he gained more general experience as demonstrator of pathology, still at St. Bartholomew's, and was holding this post and also working in the throat department at the outbreak of the war. Just joined up immediately and was in France by the end of August, 1914, serving as bacteriologist and then as surgeon specialist. After the war he returned to his work in the pathological department and in 1920 took his F.R.C.S. Shortly after this he was appointed assistant surgeon to the Throat Hospital, Golden-square, and in 1922, soon after his marriage to Alice Marie, daughter of H. B. Mactaggart, was made aural surgeon to St. Bartholomew's. He also held appointments as aural surgeon to the National Hospital, Queen-square, to the Alexandra Hospital for Children, Swanley, and to the Lord Mayor Treloar Hospital at Alton, the Foundling Hospital, the Harrow Hospital, and the West Suffolk Hospital. His surgical work was thorough, careful, and well judged, and he never spared himself the effort of providing opportunities for the cheerful talk which brings encouragement to the patient awaiting operation or recovering therefrom. It was this sympathetic quality joined to ability that brought him success in practice.

To Theodore Just's prowess at school in athletics and games we have already referred. At the university he soon made his name as an exceptional half-miler. He represented Cambridge against Oxford in 1907 as second string, when he ran third and was awarded his half-blue. In 1908 he reached his peak as an athlete; he got his full blue and won the Inter-Varsity half mile in 1 min. 55·8 sec.—a time that has only twice been beaten. In the same year he won the A.A.A. half mile championship and represented Great Britain in the Olympic Games in the half mile and in the 1600 metres relay race. He was elected president of the C.U.A.C. for the 1909 Inter-Varsity sports and was beaten by inches by Stormonth Darling. At St. Bartholomew's he was the mainstay of a team that won the Inter-Hospital Athletic Shield, and also played three-quarter in the Rugby fifteen. In later years he became a keen golfer and was a well-known and popular figure at Denham Golf Club. He took a most enthusiastic interest in all the games at the medical school, and was highly gratified to be elected president of the St. Bartholomew's Athletic Club shortly before his death.

Theodore Just enjoyed his work as much as he did his leisure hours in the open air or at his home. He infected his companions with his cheerful philosophy of which the memory will survive.

Dr. Geoffrey Evans writes: "We who work at St. Bartholomew's Hospital have lost a real friend in Theodore Just. He came to us with a great athletic record, and throughout his hospital career he maintained his keen interest in athletics. He played for the hospital in the Rugby fifteen and won prizes in the inter-hospital athletic sports; more recently he occupied the position of president of the hospital athletic club. He will be greatly missed also in the masonic world. In 1930 he was Master of the Rahere Lodge, and this year of his death he occupied the Chair of the Chapter. We shall miss him in his professional work, which was of the highest order. His natural simple manner endeared him to children, and he had already reached the first rank in his special department as an aural surgeon. To his contemporaries Theodore Just was a most lovable man, and his nickname of 'Father Just' gives an indication of his kindly way and the affection that was felt for him."

W. S. PAGET-TOMLINSON, M.D. Liverp., F.R.C.P. Lond.

Dr. Paget-Tomlinson's career as a medical practitioner ceased in 1889, when he succeeded to family estates. But he remained both a student of medical affairs and an exponent of the medical outlook in local government and social service; and he leaves not only a fine record of devotion to duty but also a series of achievements that were essentially the fruit of medical experience.

Born 88 years ago, the youngest son of Thomas Paget, he entered the Royal Infirmary School of Medicine at Liverpool in 1866, later going on to University College Hospital in London. After a few months in Berlin and Vienna he settled in practice at Blundellsands, on the Mersey, and remained there 18 years, until the death of a relative brought him a change of home, of name, and—which was by no means welcome—of occupation. He had to assume the functions of a Westmorland landowner, and within a few years he was High Sheriff of the county; but his interests were not confined to the more decorative offices or to his own estates. He early joined the county council and was chairman at various times, and for long periods, of its agricultural and diseases of animals committee, of its school medical inspection committee, and of its public health committee. His methods included persuasion by example: thus he arranged, on his own account, for the dental care of every child in Kirkby Lonsdale for two years—an experiment demonstrating much better than mere words the necessity for appointing a county dental surgeon. The 28 years during which he presided over the school medical inspection committee covered the development of the school medical service from nothing at all to a large organisation; he was, says one who worked with him, "an ideal chairman. To each of us he was like a father, full of interest in our work, happy and serene in his outlook on life." He was a keen naturalist, with special knowledge of birds, and he circulated among Westmorland school-children a book he wrote for them, "Kindness to all Created Things." His liking for young people also led him to give his services to particular schools: for a time he was a governor of Sedbergh; since 1908 he had been chairman of Queen Elizabeth School at Kirkby Lonsdale; and for 32 years he was chairman of Casterton School. A more personal memorial, however, is Meathop Sanatorium, the first tuberculosis sanatorium for the poor to be established in this country, which was opened in 1900 at the instigation of Dr. Paget-Tomlinson and the late Dr. W. Rushton Parker. This institution he supported largely from his own means, and many other local buildings and charities have benefited from his discerning generosity. A musician and singer, he was choirmaster at the Kirkby Lonsdale parish church and a mainstay of the choral society. A friend says of him that "he was the happy possessor of many gifts which he delighted to share with others."

Dr. Paget-Tomlinson was elected a fellow of the Royal College of Physicians of London in 1927 and received the degree of LL.D. from Liverpool on the centenary of the medical school in 1934. He married, in 1874, Margaret, second daughter of Dr. J. Llewellyn Price of Standish. The eldest of his sons died three weeks before his father; the survivors of the family are a daughter and two younger sons, one of whom is Dr. E. E. Paget-Tomlinson of Kirklington.

ALBERT SOPHRON SIEGER, L.R.C.P. Edin., D.P.H.

THE death of Dr. A. S. Sieger on Feb. 4th has removed from Clydeside one of the most popular figures in the shipping circles of the port of Glasgow. Wherever he went in the course of his official duties as port medical officer he made friends and kept them; and this genial habit and his interest in yachting and cricket will not soon be forgotten.

Dr. Sieger was born in 1875 at Greenock, where he was educated at the Glebe School and the Kilblain Academy; later he went to Glasgow to study medicine, and took the triple qualification in 1899. For some months he was engaged in general practice, but before the end of the year he was appointed senior civil surgeon to the military hospital at Devonport under Surgeon-General G. Evatt, C.B., M.D., and served there until 1901. From Devonport he went to South Africa in the same capacity and was stationed at Kimberley, Wynberg, and East London in the last stages of the Boer War. Returning to this country in 1902 he decided to devote his energies to public health work, and in 1903 he took his D.P.H. at Edinburgh. In December of the same year he was appointed assistant port medical officer under the Glasgow Port Local Authority, a post which he held for 33 years. At the outbreak of the late war he was transferred to Ruchill fever hospital and later acted as superintendent of Shieldhall fever hospital. Towards the close of 1915 he joined the R.A.M.C. and was for a short time attached to the Redford Barracks at Edinburgh; then he went to Malta, and later to Alexandria, where he served as embarkation medical officer. In 1919 he was demobilised with the rank of captain and resumed his service with the Glasgow Port Local Authority as port medical officer and, after 1920, inspector of aliens. Dr. Sieger was a prominent member of the Association of Port Sanitary Officers and had looked forward to the forthcoming meeting of this association at Glasgow, with the arrangements for which he was actively concerned. He leaves a widow and three children.

JAMES MAXWELL WARNOCK, M.D. Belf.

Dr. J. M. Warnock, assistant medical officer of the Ards District Hospital, died at his home in Newtownards on Jan. 31st. He was a student of the old Queen's College, Belfast, and graduated in the Royal University of Ireland in 1906, taking his M.D. in 1910. After qualification, he worked for a time in Nottingham, and then settled in private practice at Newtownards. He was appointed medical officer to the Union Infirmary on the death of Dr. R. C. Parke in 1912, and by his conscientiousness and hard work earned the respect of medical men in the district. A native of Kirkcubbin in the Ards peninsula, he was genuinely attached to the locality and its people; and he had a discerning taste for music. The manner of his death bore testimony to his devotion to duty. Falling a victim to influenza he was urged to take a holiday but refused on the grounds that he could not run away from his practice in the middle of an epidemic. Soon after resuming work he took ill with broncho-pneumonia and died within a few days. He is survived by his wife, two sons, and a daughter.

INTERNATIONAL HOSPITAL ASSOCIATION.—The fifth International Hospital Congress will be held in Paris from July 5th to 11th. Prof. Roussy (Paris) will give a lecture at the first session on the care of the cancer patient in the hospital. At the second session various aspects of hospitals and nursing in France will be dealt with, while at the third session there will be a discussion on how the hospital can increase its income and reduce its expenditure without detriment to its work. At the fourth session the methodical organisation of hospital services will be considered, and the last two sessions will be devoted to short papers and discussions. The secretariat of the congress may be addressed at the offices of the Direction Générale de l'Administration de l'Assistance Publique, 3, Avenue Victoria, Paris IV, or through Mr. Sydney Lamb, general secretary, 87, Lord-street, Liverpool, 2.

MEDICAL NEWS

University of Cambridge

The Raymond Horton-Smith prize for the best thesis of 1935–36 has been divided between Dr. Frank Goldby and Mr. John Gray, M.Chir.

The faculty board of medicine have coöpted Dr. H. Morley Fletcher and Prof. F. R. Fraser as members of the board.

Royal College of Surgeons of England

A meeting of the council of the College was held on Feb. 11th, with Sir Cuthbert Wallace, the president, in the chair. Sir Charles Gordon-Watson was appointed Bradshaw lecturer and Sir Charles Sherrington, O.M., was appointed Thomas Vicary lecturer for this year.

Diplomas of membership were granted to W. J. C. Crisp and to the candidates given in our issue of Feb. 6th, p. 361, and diplomas in tropical medicine and hygiene to the candidates mentioned on p. 362. Diplomas in medical radiology were granted jointly with the Royal College of Physicians to G. G. Binnie, Frederick Constant, Mary J. Cronin, and J. M. Lees. Diplomas in anæsthetics were granted jointly with the Royal College of Physicians, under the special conditions of the regulations, to Hurry Richards and R. D. Pramanik.

The following L.C.C. hospitals were recognised for the six months' surgical practice required of candidates for the final fellowship examination: Dulwich; St. Giles', Camberwell; St. Olave's, Rotherhithe; Fulham; St. Leonard's, Shoreditch; Mile End; St. Alfege's, Greenwich; St. Andrew's, Bow; St. James', Balham; Lambeth; Lewisham; St. Mary, Islington; St. Charles', Ladbroke-grove; St. Mary Abbot's, Kensington; Bethnal Green; and Hackney; but candidates who wish to qualify for admission to the final fellowship examination by holding a resident post at one of the above L.C.C. hospitals are required to produce evidence of the suitability of such post before accepting the appointment.

Conjoint Examining Board in England

The following hospitals were added last year to the list of institutions recognised by the Board:—

For the D.A.—Kettering and District Hospital; North Middlesex County Hospital; West Middlesex County Hospital; Oldchurch Hospital, Romford; County and City of Perth Royal Infirmary; and Hospital for Sick Children, Great Ormond-street (under special conditions).

For the D.C.H.—Belgrave Hospital for Children, Clapham; Evelina Hospital for Sick Children, Southwark; Hospital for Sick Children, Great Ormond-street; Paddington Green Children's Hospital; Princess Elizabeth of York Hospital for Children, Shadwell; Queen's Hospital for Children, Hackney; Royal Waterloo Hospital for Children and Women; South-Eastern Hospital for Children, Sydenham; Victoria Hospital for Children, Tite-street; Alder Hey Hospital for Children, Liverpool; Booth Hall Hospital for Children, Manchester; Jenny Lind Hospital for Children, Norwich; and St. Mary's Hospital, Portsmouth.

For the D.L.O.—East Suffolk and Ipswich Hospital; Radcliffe Infirmary, Oxford; Royal Hospital, Wolverhampton; and Royal Infirmary, Doncaster.

For the D.O.M.S.—East Suffolk and Ipswich Hospital; Royal Infirmary, Doncaster; and Sussex Eye Hospital, Brighton.

For the D.P.M.—Erdington House, Birmingham.

For the D.T.M. & H.—Usher Institute, Edinburgh.

St. Vincent Association

A house dinner will be held on Friday, Feb. 26th, at 6.30 P.M., at the Old Cheshire Cheese, Fleet-street, London, E.C. Afterwards Mr. Hector Hughes, K.C., and Dr. F. W. Crossley-Holland will speak on some legal aspects of medical representation.

"Science and Building" Exhibition

This exhibition, which is to be held at the Building Centre, 158, New Bond-street, London, W., from March 1st to 25th, is being arranged by the Department of Scientific and Industrial Research. It includes exhibits by the Building Research Station, the Forest Products Research Laboratory, the National Physical Laboratory, the Water Pollution Research Board, the Department's Chemical Research Laboratory, the Non-Ferrous Metals Research Association, and other bodies. Cinema films will be shown during the course of each day, and lectures have also been arranged for certain evenings.

University of Manchester

The following appointments are announced: Dr. P. M. Crowe, assistant lecturer in mental diseases; Dr. F. A. Gill, special lecturer in mental diseases; Dr. H. B. May, assistant lecturer in bacteriology; Mr. H. G. Watkin, senior lecturer and clinical demonstrator in orthodontics; Mr. A. W. Moule, lecturer and demonstrator in clinical dental surgery; Dr. C. H. Adderley, assistant bacteriologist in the routine section of the department of bacteriology and preventive medicine.

Society of Public Analysts

A meeting of this society will be held on Friday, March 5th, at the Chemical Society's rooms, Burlington House, Piccadilly, W., at 5.45 P.M., at which Prof. G. Barger, F.R.S., will deliver an address on the alkaloids of ergot.

Course in Psychological Medicine

The second part of the course of instruction for a diploma in psychological medicine, which has been arranged by the London County Council and is being held at the Maudsley Hospital, Denmark Hill, S.E., will start on March 1st and continue till May 28th. Further information may be had from Prof. F. L. Golla, hon. director of the medical school at the Maudsley Hospital.

Post-graduate Work at Aberdeen

A course of post-graduate study will be held at Aberdeen Royal Infirmary, Forresterhill, and Aberdeen City Hospital from April 20th till June 17th. The lectures and demonstrations will be given at 3.15 P.M. on Tuesdays, and repeated at the same time on Thursdays. Further particulars may be had from the secretary of the University.

Demonstrations of Contraceptive Technique

On Wednesday, March 3rd, at 2.30 P.M., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher. Application for tickets from medical practitioners and senior students should be made to the hon. secretary of the Society for Constructive Birth Control, 108, Whitfield-street, London, W.1.

National Association for the Prevention of Tuberculosis

The 23rd annual conference of this association will be held in Bristol on July 1st, 2nd, and 3rd. The association may be addressed at Tavistock House North, Tavistock-square, W.C.

Physical Recreation Committees

The Government has appointed a national advisory council and a grants committee for England and Wales in connexion with physical training and recreation. The 31 members of the council include Lord Aberdare (chairman), hon. treasurer of the National Association of Boys' Clubs; the Hon. Edward Cadogan, chairman of the Juvenile Organisations Committee of the Board of Education (deputy chairman); Mr. Philip Noel Baker, M.P.; Lord Burghley, M.P.; Sir Noel Curtis-Bennett, hon. treasurer of the National Playing Fields Association; Lord Dawson; Brigadier General Sir Wyndham Deedes; Major A. H. A. Gem, organiser of physical training under the London County Council; Mr. P. D. Innes, D.Sc., chief education officer for Birmingham; Sir William Jenkins, M.P.; Sir E. K. Le Fleming, chairman of the Council of the British Medical Association; Miss Margaret Morris, principal of the Institute of Margaret Morris Dancing; Miss Dorothy Round; Miss P. Spafford, secretary of the Ling Physical Education Association, and Mr. W. W. Wakefield, M.P. The first meeting of the council will take place on Wednesday, March 3rd.

The Grants committee will consist of Sir Henry Pelham (chairman), Mrs. R. C. Assheton, and Mr. J. C. Fuller. The secretary of both bodies will be Captain L. F. Ellis, to whom all communications should be addressed at Queen Anne's Chambers, Tothill-street, London, S.W.1.

London School of Hygiene and Tropical Medicine

The annual malaria-control course for laymen will be held at the school (Keppel-street, W.C.) from June 21st to 25th under the direction of Sir Malcolm Watson. The following additional lectures have also been arranged: Mr. H. H. Clay, water-supplies (June 22nd at 2.15 P.M.), and conservancy and sewage disposal (June 23rd at 2.15 P.M.); and Dr. G. P. Crowden, insulation against heat and cold (June 24th at 2.15 P.M.).

St. Charles' Hospital, Kensington

On Feb. 12th Lord Snell, chairman of the London County Council, opened the new nurses' home at this hospital. Hitherto many of the nursing and domestic staff and two of the medical staff have been non-resident owing to lack of accommodation. Other arrangements were also unsatisfactory—the sitting-room accommodation for nursing staff was inadequate, lectures were held in a part of a ward partitioned off for the purpose, and there was no room for training probationers in practical work. The new home, which accommodates 121 nursing and domestic staff, is a four-storey building connected with the main administrative block by a paved footway. All floors are served by a passenger lift. The bedrooms are of the larger size decided on as a standard by the council in July, 1934, and each bedroom is fitted with a lavatory basin with hot and cold water and a built-in wardrobe cupboard. For certain of the senior nurses a small sitting-room is provided adjoining the bedroom. Large common rooms are also provided for nurses and for sisters. Bathrooms, shampoo-rooms, tea-making rooms, and box-rooms are provided on each floor, and on the first floor there is a small laundry for the personal use of nurses. There is also a lecture theatre, demonstration room, and library for probationers. Existing buildings have been adapted to provide accommodation for five assistant medical officers, the matron, and the assistant matron. The total cost is about £38,425.

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Hon. Asst. Physician.
All Saints' Hosp., Austral-street, West-square, S.E.—Res. H.S., at rate of £100.
Army Dental Corps.—Eight Commissions.
Baghdad, Royal College of Medicine.—Prof. of Pathology, £150 per mensem.
Bangor, Caernarvonshire and Anglesey Infirmary.—Sen. and Jun. H.S., £150 and £100 respectively.
Bath, Royal United Hosp.—H.S. to Ear, Nose, and Throat Dept., at rate of £150.
Belfast, Forster Green Hosp. for Consumption, &c.—H.P., at rate of £150.
Birmingham, Dudley-road Hosp.—Jun. M.O., at rate of £200.
Birmingham, Romsley Hill Sanatorium.—Res. Asst. M.O., at rate of £240.
Birmingham, Selly Oak Hosp.—Jnn. M.O., at rate of £200.
Blackburn Royal Infirmary.—Cas. O., £175.
Bradford Royal Eye and Ear Hosp.—H.S., £160.
Bradford Royal Infirmary.—H.S., at rate of £150.
Bradford, St. Luke's Municipal General Hosp.—H.P.'s and H.S.'s, each at rate of £150.
Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.
Brighton Sanatorium and Infectious Disease Hosp.—Jun. Res. M.O., at rate of £250.
Bristol Eye Hosp.—Hon. Asst. Ophth. Surgeon. Also Jun. H.S., at rate of £100.
Bristol Royal Infirmary.—Clin. Anæsthetist to Dental Dept., £150.
Burton-on-Trent General Infirmary.—H.P. and Cas. O., £150.
Cambridge, Addenbrooke's Hosp.—H.S., at rate of £130.
Cardiff, Prince of Wales' Orthopædic Hosp.—H.S., and for Country Branch, at rate of £200.
Cardiff, Welsh National School of Medicine.—Four Scholarships, £250, £200 and £150.
Carlisle, Cumberland Infirmary.—Res. M.O.'s, at rate of £175 and £155.
Central London Ophthalmic Hosp., Judd-street, W.C.—Sen. and Jun. H.S.'s, £120 and £100 respectively.
City of London Maternity Hosp., City-road, E.C.—Asst. Res. M.O., at rate of £80.
Croydon General Hosp.—Hon. Asst. Surgeon to Ear, Nose, and Throat Dept.
Denbigh County.—Deputy County M.O.H. and School M.O., £700.
Derby, Derbyshire Royal Infirmary.—H.S. Also Cas. O. and Orthopædic H.S., each £150.
Douglas, Isle of Man Noble's Isle of Man Hosp. and Dispensary.—Res. H.S., £175.
Dreadnought Hosp., Greenwich, S.E.—H.S. and H.P., each at rate of £110.
Ealing, King Edward Memorial Hosp.—Jun. Res. M.O., at rate of £150.
East Ham Memorial Hosp., Shrewsbury-road, E.—Physician for Skin Dept.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Third H.S., at rate of £50.
Exeter, Royal Devon and Exeter Hosp.—H.S., at rate of £150.
Gloucestershire Royal Infirmary, &c.—H.S. to Ear, Nose, and Throat Dept., at rate of £150.
Halifax General Hosp.—Jun. Res. M.O., £250.
Halifax Royal Infirmary.—Second H.S., at rate of £175.
Hosp. for Diseases of the Skin, Blackfriars, S.E.—Additional Member for Hon. Staff.
Huddersfield County Borough.—Asst. School M.O., £500.
Hull, Anlaby-road Institution.—Asst. M.O., £350.
Hull City Mental Hosp., Willerby.—Asst. M.O., £500.
Hull Royal Infirmary.—H.S. to Ophth. and Ear, Nose, and Throat Depts., also second Cas. O., each at rate of £150.
Ipswich, East Suffolk and Ipswich Hosp.—H.P., £144.
Leeds General Infirmary.—Part-time M.O. to X Ray Therapy Dept., £100.
Leeds Maternity Hosp. and Hosp. for Women.—Joint Pathologist, £600.
Leeds University, Faculty of Medicine.—Med. Tutor and Registrar, £500.
Leicester City Isolation Hosp. and Sanatorium.—Jun. Asst. M.O., at rate of £300.
Leicester Royal Infirmary.—Res. Anæsthetists, at rate of £150. H.S.'s, Cas. O.'s, and H.P.'s, at rate of £125. Also Jun. Cas. O., £100.
Lincoln County Hosp.—Sen. and Jun. H.S., £250 and £150 respectively.
Liverpool and District Hosp. for Diseases of the Heart.—H.P., £100.
Liverpool Heart Hosp.—Additional Hon. Asst. Physician. Also First Asst.
London County Council.—Asst. M.O.'s for Mental Hosps. Dept., each £470. Also Part-time Cons. Ophthalmologists, each £125, &c.
London Hosp., E.—First Asst. to Ophth. Dept.
Manchester, Ancoats Hosp.—Med. Reg., £50.
Manchester, Duchess of York Hosp. for Babies.—Sen. and Jun. Res. M.O.'s, at rate of £125 and £75 respectively.
Manchester, Park Hosp., Davyhulme.—Res. Med. Supt., £850, &c.
Manchester Royal Children's Hospital, Pendlebury.—Asst. M.O. for Out-Patients' Dept., at rate of £150.
Miller General Hospital, Greenwich-road, S.E.—H.S. and Cas. O., at rate of £100 and £150 respectively.
Newcastle-upon-Tyne Eye Hosp.—Sen. H.S., £300.
North Riding of Yorkshire County Council, &c.—Borough M.O.H. and Asst. to County M.O.H., £800.
Norwich City.—Res. M.O., Isolation Hosp., Asst. M.O.H., and Asst. School M.O., £450.
Nottingham and Midland Eye Infirmary.—Res. H.S., £200.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.P. and H.S., each at rate of £120.
Poplar Hosp. for Accidents, East India Dock-road, E.—Res. M.O., at rate of £175.
Preston and County of Lancaster Royal Infirmary.—H.S. to Eye, Ear, Nose, and Throat Dept., at rate of £150.
Preston, Whiston Institution Infirmary, near Prescot.—Visiting Anæsthetist, £275.
Princess Beatrice Hosp., Earl's Court, S.W.—Res. Surg. O., at rate of £200. H.P. and Cas. O., at rate of £110. Also Cas. O. and Obstet. H.S., at rate of £110.
Princess Elizabeth of York Hosp. for Children, Shadwell, E.—H.P., at rate of £125.
Prince of Wales's General Hosp., N.—Jun. H.P. and two Jun. H.S.'s, each at rate of £90.
Queen's Hosp. for Children, Hackney-road, E.—H.P. and Cas. O., each at rate of £100.
Rotherham Hosp.—Sen. H.S. or Physician, £200. Also H.P., £180.
Royal Eye Hosp., St. George's-circus, S.E.—Sen. H.S. Also two Asst. Surgeons, at rate of £150 and £100 respectively.
Royal London Ophthalmic Hosp., City-road, E.C.—Sen. Res. O., at rate of £150.
Royal National Orthopædic Hospital, 234, Great Portland-street, W.—Two H.S.'s, each at rate of £150.
Royal Naval Medical Service.—Vacancies for M.O.'s.
Royal Northern Hosp., Holloway, N.—Surg. Reg., £300. Also Consulting Physicist.
Ruislip-Northwood Urban District.—M.O.H., £250.
St. Albans, County Institution, Oster House.—H.S., at rate of £150.
St. John's Hosp. for Diseases of the Skin, Leicester-square, W.C.—Out-patient and In-patient Med. Registrars, each £50.
St. Mary's Hosp., W.—Surgical Registrar, £200.
Salford City.—Asst. Maternity and Child Welfare M.O., £500.
Scarborough (New) Hosp.—H.P., at rate of £130.
Smethwick, St. Chad's Hosp.—Res. Obstet. O., £350.
Stafford, Staffordshire General Infirmary.—H.P. and Cas. O., at rate of £150.
Stoke-on-Trent, Burslem, Haywood, and Tunstall War Memorial Hosp.—Res. H.P., at rate of £150.
Tancred Studentships.—Three Studentships, each £100.
Taunton and Somerset Hosp.—H.S., at rate of £100.
Tunbridge Wells, Kent and Sussex Hosp.—H.S., £150.
West Ham County Borough.—First Asst. Res. M.O. for Central Home, Leytonstone, £525.
West London Hosp., Hammersmith, W.—Asst. Pathologist, £300. Also H.P. and two H.S.'s, each at rate of £100.
Wickford, Essex, Runwell Hosp.—H.P., at rate of £150.

Medical Referee under the Workmen's Compensation Act, 1925, for the Ashton-under-Lyne and Stalybridge County Court District (Circuit No. 10). Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before March 8th.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Ware (Hertford) and St. Marys (Isles of Scilly) (Cornwall).

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, Feb. 22nd.
Odontology. 8 P.M. Mrs. Lilian Lindsay: Sir John Bland-Sutton and the Odontological Society. Mr. T. W. B. Osborn and Mr. J. N. Noriskin (Witwatersrand): The Relation between Diet and Caries in the South African Bantu. Mr. Guy Ellingham: The Osmotic Pressure of Local Anæsthetic Solutions.
TUESDAY.
Medicine. 5 P.M. Dr. W. G. Savage: Milk as a Factor in the Cause of Disease. Prof. G. S. Wilson and Prof. F. C. Minett will also speak.
WEDNESDAY.
Comparative Medicine. 5 P.M. Mr. J. R. M. Innes: Lesions in the Organs of Rabbits produced by Single and Repeated Injections of B C G. Major T. Dalling: Notes on Distemper Immunisation. Dr. E. T. C. Spooner: An Epidemic of Ferret Distemper Presenting Certain Interesting Characters.
THURSDAY.
Urology. 8.30 P.M. Mr. Geoffrey Parker: The Extra-urinary Causes of Urinary Obstruction.
FRIDAY.
Disease in Children. 5 P.M. (Cases at 4.30 P.M.) Mr. Harold Edwards: 1. Exomphalos: Result 6¼ Years after Operation. Dr. Wilfrid Sheldon and Mr. Harold Edwards: 2. Congenital Stricture of the Recto-sigmoid. Mr. R. R. Prewer (for Dr. David Levi): 3. Achalasia of the Œsophagus in a Child aged 10. Dr. Reginald Lightwood: 4. Infantile Myxœdema. Dr. Seton Campbell and Dr. A. J. Hardy (for Dr. Donald Paterson): 5. Actinomycosis of the Lung. Dr. H. J. Wallace: 6. Staphylococcal Pneumonia. Dr. T. A. Shaw: 7. Spasmus Nutans: Monocular Nystagmus.
Epidemiology and State Medicine. 8.15 P.M. Dr. J. M. Alston and Dr. W. A. Brown: Infective Jaundice.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY, Feb. 22nd.—8.30 P.M., Dr. C. E. Lakin and Dr. Geoffrey Harrison: Ætiology and Diagnosis of Jaundice.
WEDNESDAY.—9 P.M., Sir Thomas Dunhill: Surgery of the Thyroid Gland. (Second Lettsomian lecture.)

MEDICO-LEGAL SOCIETY.
THURSDAY, Feb. 25th.—8.30 P.M. (Manson House, 26, Portland-place, W.), Mr. Paul C. Davie: Silicosis: an Administrative Experiment.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Fever and School Medical Groups.
FRIDAY, Feb. 26th.—5.30 P.M., Discussion on the Control of Whooping-cough.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, 5, Lisle-street, W.C.
WEDNESDAY, Feb. 24th.—4.30 P.M., Clinical Cases. 5 P.M., Mr. T. Pomfret Kilner: Reconstructive Surgery.

HUNTERIAN SOCIETY.
MONDAY, Feb. 22nd.—9 P.M. (Mansion House, E.C.), Lord Horder: The Hunterian Tradition. (Hunterian oration.)

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.
TUESDAY, Feb. 23rd.—5 P.M., Dr. P. M. D'Arcy Hart: Measures for the Prevention of Pulmonary Tuberculosis among Adults in England—in the Past and in the Future. (Second Milroy lecture.)
THURSDAY.—5 P.M., Dr. D. E. Denny-Brown: The Nervous Control of Micturition and its Disorders. (First Goulstonian lecture.)

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn-fields, W.C.
MONDAY, Feb. 22nd.—5 P.M., Dr. David Slome: The Nervous Factor in Traumatic Shock. (Arris and Gale lecture.)

ROYAL INSTITUTION, 21, Albemarle-street, W.
FRIDAY, Feb. 26th.—9 P.M., Lord Horder: Old Diseases and New.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY, Feb. 23rd.—4.30 P.M., Dr. Gardiner-Hill: Endocrine Diseases and Disturbances.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Dr. A. A. Miles: Blood Culture. 3.15 P.M., clinical and pathological conference (surgical).
THURSDAY.—Noon, clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. A. K. Henry: Demonstrations on the Cadaver of Surgical Exposures. 3.30 P.M., Mr. Charles D. Read: Dysmenorrhœa.
FRIDAY.—2 P.M., operative obstetrics. 2.30 P.M., Prof. Hey Groves: Fractures. 3 P.M., department of gynæcology, pathological demonstration.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics or operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Feb. 22nd.—10 A.M., skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Mr. Neil Sinclair: Appendicitis.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Mr. Alex. Roche: Hæmaturia and Renal Growths.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics. 4.15 P.M., Mr. Steadman: Pyorrhœa Alveolaris.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, and genito-urinary and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. Eric Hudson: Pneumonia.
SATURDAY.—10 A.M., children's and surgical clinic. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Feb. 22nd, to SATURDAY, Feb. 27th.—ST. JOHN'S HOSPITAL, Leicester-square, W.C., afternoon course in dermatology (open to non-members).—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues., 8.30 P.M., Mr. Cecil Flemming: Liver, Spleen, and Pancreas. Thurs., 8.30 P.M., Mr. Michael Smyth: Large Intestine and Rectum.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues. and Thurs., 8 P.M., clinical and pathological course.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E., all-day course in medicine, surgery, and gynæcology.—BROMPTON HOSPITAL, S.W., 5 P.M., twice weekly, M.R.C.P. course.—INFANTS HOSPITAL, Vincent-square, S.W., Mons., Weds., and Fris., 5.15 P.M., primary F.R.C.S. course.—Courses arranged by the fellowship are open only to members.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY Feb. 25th.—2 P.M., Dr. R. S. Frew: Useful Remedies in Diseases of the Chest. 3 P.M., Dr. W. W. Payne: The Investigation of Hepatic Inefficiency.
Out-patient clinics daily at 10 A.M., and ward visits daily at 2 P.M.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Feb. 22nd.—3.30 P.M., Dr. Kinnier Wilson: Congenital and Heredo-familial Diseases (I).
TUESDAY.—3.30 P.M., Dr. Critchley: Vascular Diseases of the Brain (I).
WEDNESDAY.—3.30 P.M., Dr. Kinnier Wilson: Clinical Demonstration.
THURSDAY.—3.30 P.M., Dr. Critchley: Vascular Diseases of the Brain (II).
FRIDAY.—3.30 P.M., Dr. Purdon Martin: Muscular Atrophy of Spinal Origin.
Out-patient clinic daily at 2 P.M.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY, Feb. 25th.—3 P.M., Dr. Anthony Feiling: Clinical Demonstration.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.
TUESDAY, Feb. 23rd.—5.30 P.M., Dr. F. W. Price: Heart Disease and Childbearing (I).

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Feb. 26th.—4 P.M., Mr. F. W. Watkyn-Thomas: Otosclerosis.

HAMPSTEAD GENERAL AND NORTH WEST LONDON HOSPITAL, N.W.
WEDNESDAY, Feb. 24th.—4 P.M., Mr. H. Lawson Whale: Epistaxis.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY, Feb. 23rd.—5 P.M., Dr. S. E. Dore: Pruritus, Prurigo, and Lichenification.
THURSDAY.—5 P.M., Dr. A. Burrows: Malignant Conditions of the Skin.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, 42, Ranelagh-road, S.W.
FRIDAY, Feb. 26th.—4.30 P.M., Dr. Francis Bach: Hydrological Methods of Treatment in the Rheumatic Diseases.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY, Feb. 24th.—4 P.M. (St. James' Hospital, Ouseley-road, S.W.), Dr. C. E. Lakin: Demonstration of Medical Cases.

LEEDS GENERAL INFIRMARY.
TUESDAY, Feb. 23rd.—3.30 P.M., Mr. Broomhead: Short Talk on Amputation Stumps followed by Demonstration of Patients and Cinematograph Film of Limbless Men and Demonstration of Artificial Limbs.

ST. MARY'S HOSPITALS, Manchester.
THURSDAY, Feb. 25th.—4.15 P.M. (Whitworth-street West Hospital), Dr. W. R. Addis: Albuminuria in Pregnancy.

ANCOATS HOSPITAL, Manchester.
THURSDAY, Feb. 25th.—4.15 P.M., Dr. E. D. Gray: X Ray Investigation of the Urinary Tract.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, Feb. 24th.—4.15 P.M. (Western Infirmary), Mr. A. J. Hutton: Surgical Cases.

NOTES, COMMENTS, AND ABSTRACTS

MOVEMENTS OF THE DIGESTIVE TRACT

Dr. RUSSELL J. REYNOLDS delivered a Hunterian lecture at the Royal College of Surgeons of England on Jan. 20th entitled "Movements of the Œsophagus, Stomach, Duodenum, and Ileum during the Passage of an Opaque Meal."

He explained that he would illustrate his remarks by cinematograph films made with an apparatus designed by himself, by which it was possible to obtain clear moving records of the image on a radiographic screen. This method had the advantage that it perpetuated the whole of a radiographic examination instead of only chosen instants, so that the observer could study the record in detail afterwards. The value of these films was strikingly demonstrated by the fact that the observer noticed new points every time he examined them. It was only necessary to expose a film for long enough to include several cycles of movement of an organ. Any number of positives could be printed, and these could have their ends joined to form a circular band, which could be projected continuously as often as necessary.

THE ŒSOPHAGUS AND STOMACH

On the fluorescent screen the image of the œsophagus appeared to be narrowed in three places: at the upper end, where it was constricted by the inferior constrictor muscle of the pharynx; where it was crossed by the left main bronchus; and where it passed through the diaphragm. It was dilated just above the diaphragm. During the act of swallowing, a bolus of food was projected to the back of the mouth by means of an upward and backward movement of the tongue. A reflex action, stimulated by contact with the sensitive nerves in this area, caused the suprahyoid and associated muscles to contract, drawing the hyoid upwards and backwards and rotating it about a lateral axis. The food was then jerked into the pharynx, which was attached to the hyoid and therefore drawn up with it. The jerk carried the bolus over the epiglottis, which, with the raising of the hyoid, had closed the opening of the larynx. The liquid then passed rapidly down under the influence of gravity, clinging to the sides of the œsophagus, which seemed to be dilated to receive it. No peristalsis was visible. On reaching the level of the clavicle the food was held up, either at the crossing of the left bronchus or by a weak sphincter where the muscle changed from a voluntary to an involuntary type.

The food might then follow various courses. Solid food was passed slowly down by peristalsis and went straight through the cardia as the wave of peristaltic relaxation reached the sphincter. Semi-solid food travelled in much the same manner, but liquid might act in one of three ways. It might pass down in a thin stream under the influence of gravity, be held up at the cardia and fill the œsophageal ampulla like a test-tube until the pressure was sufficient to open the cardia; the column then all entered the stomach at once. Alternatively, gushes of fluid might pass rapidly down and enter the stomach directly without any delay at the cardia; this appeared to be due to the intermittent yielding of the intrathoracic sphincter. Thirdly, the liquid might pass into the stomach in a constant thin stream under the influence of gravity. In this case it was presumably allowed to escape through the constriction at the thoracic inlet at a constant rate, as it would be more likely to do if the constriction were purely mechanical, such as that caused by the left bronchus.

After the food entered the stomach through the narrow cardiac orifice, it first passed into the upper part of the stomach, which comprised most of the fundus. This part was passive; no peristalsis was observed, and it merely dilated against the normal muscular tone as it filled. It was separated from the more active lower parts of the stomach by a weak sphincter, which relaxed when a certain pressure was reached and allowed the food to pass through along the greater curvature. When the lower part of the stomach was dilated, peristalsis began and passed the food along to the pyloric part. Peristalsis caused a rise in pressure in the middle part of the stomach and the food regurgitated into the fundus. General contraction forced the head of the food column through the pylorus into the duodenum. The passage of liquid food through a stomach of good tone was rapid: about 20 seconds from cardia to jejunum. In one of the films some of the opaque meal could be seen entering the jejunum while the last of it was still in the œsophagus.

In the hypotonic stomach the three stages were not so well shown, but the passivity of the first part and the generalised contraction of the third seemed to be invariable. The direct passage of the food out of a tonic stomach might be connected not only with the more vigorous movement, but also with the greater acidity of the stomach compared with the duodenum. The change in the character of the movement as the food passed through the stomach might depend upon the difference in the arrangement of the muscular coats. In the first part of the stomach there were many oblique fibres and few circular. In the second part, where the circular fibres were more numerous, peristalsis started, and in the third, where the circular coat was very thick and some of the longitudinal fibres interlaced with it, a generalised contraction took place. The passage of food through the duodenum did not synchronise with the time of its escape from the stomach. This might be due to the fact that the circular fibres of the stomach were not continuous with those of the duodenum, and the only fibres common to the two were a few longitudinal fibres not concerned with peristalsis. When a tonic stomach was distended with food, very little mixing with the gastric juice or digestion or absorption of any kind could take place. The food was hurried so rapidly through the duodenum that little digestion could occur there either, unless ordinary food were retained longer than the barium emulsion.

The tonic and the hypotonic stomach alike contracted vigorously when they were suddenly distended with a large quantity of food. After a short while the fibres lengthened and the stomach adapted itself to the bulk. Activity slowed down, and finally even the third part did not force enough barium meal through the pylorus to cast a shadow, but food was still passing rapidly through the duodenum 20 minutes after it had entered a tonic stomach. Digestive trouble might possibly be caused by hurried meals because the stomach was given no time to adapt itself but was compelled to pass the food through insufficiently mixed with gastric juice.

When the abdominal wall was relaxed, the whole stomach descended, except the pylorus, which was kept in position by the peritoneal attachments of the duodenum. The coils of the small intestine, which before were supporting the stomach, descended into

the pelvis, and the stomach descended with them. This gastroptosis kinked the stomach and formed a deep pool in which food might collect so that digestion was delayed and prevented. Moreover pressure on the veins and arteries might interfere with the blood-supply. A properly fitting abdominal belt would remedy the disturbance.

When the emulsion entered the small intestine it soon became diluted with secretion and spread out, so that the outline of the individual coils disappeared and the picture became indefinite. The food moved rapidly through, mainly in discrete blocks, by means of peristalsis.

"AS BIG AS A PIECE OF WOOD"

SOME of us, young or long-memoried enough, may recall receiving the above teasing reply from the grown-up pestered by our oft-repeated question, "How big is it?" A moment's reflection showed us that the answer was unsatisfactory and our shrill questioning would soon begin afresh. Readers of the January issue of the *Journal of Pathology and Bacteriology* received a pleasant surprise in the form of an inset essay, On the Quantitative Study of Tumours, which shows that the clinical investigator, like the difficult adult, is still disinclined to give plain answers to plain questions. Rather than use a millimetre rule, he prefers a vital system; for "has he not around him countless convenient measures . . . from his own head, which is sometimes swelled, to the head of a pin . . . ?" In the course of one paper the writer found tumours compared in size to "a walnut, a lentil, a pea, a large pea, a golf ball, a small hen's egg and a pigeon's egg." Many of these obviously fall within the same unsatisfactory category as the piece of wood; and with the golf ball there is the added danger of describing it as large or small which "would inevitably lead, sooner or later, to friction between the Pathological Society of Great Britain and the Royal and Ancient Club, two bodies who, if never friendly, have up to now always lived in mutual forbearance." For the oölogical method of measurement there is more to be said, though even this method is not free from objection. The range of size in eggs, from the ostrich's on the one hand to the humming bird's on the other is wide enough for all ordinary tastes and, when in doubt, there is always the cuckoo's egg which apparently varies with the size of the egg of the foster-parent. Nevertheless there are large and small eggs in every species and it must be remembered that "a small hen's egg" is not necessarily small. The writer amusingly suggests that a standard egg might be kept in a strong room in the Houses of Parliament. We should prefer the National Institute of Medical Research.

WATER POLLUTION

AMONG the useful activities of the Water Pollution Research Board not the least is the preparation and issue of its "Summary of Current Literature." The January number of this monthly publication, which starts the tenth year of issue, contains 114 abstracts of papers and reports on subjects connected with water-supply, purification, pollution, sewage treatment. It is of interest to note that French, English, and German processes have been patented for obtaining water from air, either by condensation or absorption by hygroscopic substances and distillation of the absorbed water. Another interesting observation is that the effect of rehousing in Leeds has not been to increase materially the per-capita consumption of water—the reason being, it is suggested, improvement in fittings and coöperation by consumers in prevention of waste. It is recorded that the beet-sugar manufacturers of Belgium are alive to the necessity for prevention of pollution of water courses by effluent from their works and Belgium has a Ligue nationale contre la pollution des eaux.

A good feature of these abstracts is that following the example of *Science Abstracts* they are numbered—a great assistance to the compilation of bibliographies and notes for reference.

[1] Department of Scientific and Industrial Research, Water Pollution Research, Summary of Current Literature, vol. 10, January, 1937. Abstracts Nos. 1–114. H.M. Stationery Office. 2s.

THE MIND OF THE YOUNG CHILD

AT a meeting of the Medical Society of Individual Psychology on Feb. 11th Dr. EMANUEL MILLER contributed the second of a series of lectures which form a symposium on mental health in childhood. His subject was the development of the child from suckling to the fifth year.

Dr. Miller said that even by the time suckling is ended and the teeth have begun to appear, an understanding of child behaviour can only be fully understood by considering both biological and psychological processes. With the emergence of the teeth the appetitive instincts of the child take on a special quality because the development of the muscles of the jaw develops in conjunction with other muscular coördinations. For example, the child is beginning to grasp more skilfully, and the satisfaction of hunger is in the nature of an attack on the desired object, the food. At this stage we can still say that this act is primarily in the nature of desire rather than the operation of what is sometimes called primary aggression. Aggression can only be said to come when the child's instinctual needs are frustrated. At the same time different parts of the body are involved in acts of instinct; gratification and pleasure feelings no doubt accompany these acts and make them additionally worth while. It is natural for a child to feel frustration because the manner in which its life is managed does not always keep pace with the natural rhythms in the ebb and flow of the child's appetites. The child now begins to feel a difference between itself as *me* and an obstinate external world which is merely felt as a *not me*. This *not me* is the source of privation which the child dreads. The facial expression and bodily movements of a child of this age indicate that dread and privation seem to go together. The mother or nurse is the first environmental influence which is felt as a source of gratification and of privation. In the same way as a child assimilates its food, so it assimilates this first person into itself. This is the first phase of the process of introjection of the parent's figure. When the child has begun to walk, it meets other forms of frustration which usually originate in those who satisfy its needs and who govern its needs. The child controls or restrains itself in regard to its instincts by taking into itself those very persons who have restrained it. It assimilates them. Thus within the mind of the child there develop good and bad images of the parent figures. The mother internal image is more likely to be in a normal case a kindly image than a bad one, but as it grows older this good or bad or both images is now set over against the real parents whom the child sees as a figure of its external objective world. Any angry feelings born of frustration are as likely to be directed against the image parent as the real one, and the child is constantly testing external experience to see whether it conforms to its now internal estimates of the parents. This can give rise to refractory behaviour and anxiety, anxiety to control instinctual impulses at one time or "playing up" to reinstate a pleasant good relationship with the parent by being good or by being babyish.

This being babyish may appear in behaviour as a sudden return to infantile modes of response. Having introjected the restraining parent images, the child may develop a fear of those bodily functions and organs which have been restrained or controlled; thus a child may become constipated through fear of dirtying, or refuse to eat, or may express fears indirectly about micturition and the organ associated

with it. By the eighteenth month the growth of intelligence and language gives the child an instrument for controlling the external world, and this becomes in a way an escape from instinctual pressure. His verbal behaviour therefore enables it to disguise its instinctual needs by verbal manipulations, frequently projecting upon the external world a verbal expression of its anxieties. The next year or so is concerned with attempts to understand not only the external world in general but the parents in particular. The double feelings it has about parents are intermittently solved by giving all love to one and showing hostility to the other. This mood oscillates and may be disquieting to parents, but if the parents can meet the situation with equanimity the child gradually gets assured that its hostility is an internal thing and not "just to" external facts. In fact, the child is trying to project its inner hostility of the outer world for purposes of release, and it should be given every opportunity through play to obtain this release and by contact with persons other than parents to diffuse love and hostility over a wider field.

WOMEN DISTRESSED IN MIND

THE council of the Society of the Crown of our Lord, commemorating and carrying on the work of its foundress, Miss Bertha James, who died last year, wishes to provide for educated women whose mental health is temporarily impaired the advantages of skilled medical treatment together with nursing and spiritual help. To this end an appeal has been issued to which Lord Dawson of Penn and Sir Francis Fremantle among others have put their names. A sum of £3000 is being sought for the purchase and equipment of a house which would in effect become an inexpensive nursing-home with a religious atmosphere. The Society proposes to allot the largest rooms at four to five guineas a week, the remainder at much less. It is certain that there are many patients who would benefit greatly from a stay in such a home, especially if care be taken, as no doubt it will, to select them judiciously on psychiatric as well as other grounds. We gladly endorse the appeal.

Appointments

BETTLEY, F. R., M.D., M.R.C.P. Lond., has been appointed Hon. Dermatologist and Medical Officer in Charge of the Male Venereal Diseases Centre at Cardiff Royal Infirmary.

BURN, J. L., M.D. Durh., D.P.M., Medical Officer of Health for Barnsley.

ELLIS, GWYNETH N., M.B. Lond., Assistant Medical Officer for Rhondda.

HAMILTON, W., M.B., F.R.C.S., Clinical Assistant to the Ear, Nose, and Throat Department at the Guest Hospital, Dudley.

HERRING, JEAN, M.B. St. And., Assistant Visiting Obstetrician and Gynæcologist to the Dundee Royal Infirmary.

*HUNTER, J. W. A., M.D. Edin., M.C.O.G., Senior Obstetrician and Gynæcologist to the Withington Hospital, Manchester.

KING, JANET C., M.B. Edin., D.P.H., Assistant Medical Officer for Kent.

LONG, MURIEL H. E., M.B. Lond., F.R.C.S. Eng., Surgical Registrar for the South London Hospital for Women.

*NEWTON, ROBERT, M.D. Manch., M.C.O.G., Obstetrician and Gynæcologist to the Withington Hospital, Manchester.

SEEX, I. M., M.B., F.R.C.S. Edin., Hon. Visiting Surgeon to the Department for the Treatment of Diseases of the Ear, Nose, and Throat, Royal Northern Infirmary, Inverness.

STONEHAM, G. R., M.B. N.Z., M.C.O.G., Resident Obstetrical Officer at Park Hospital, Davyhulme.

* Subject to confirmation.

Christie Hospital and Holt Radium Institute, Manchester.—The following appointments are announced:—

ROWBOTHAM, G. F., B.Sc., F.R.C.S. Eng., Hon. Neurological Surgeon;

WATKINS, K. H., M.B. Manch., M.S. Lond., F.R.C.S. Eng., Hon. Urological Surgeon; and

BENTLEY, F. H., M.B. Manch., F.R.C.S. Eng., Hon. Plastic Surgeon.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I.) and (II.) = Assistant Medical Officer, Grades I or II. Temp. D.M.O. = Temporary District Medical Officer.

WHYTE, ELIZABETH C., M.B., A.M.O. (II.), Grove;

FRIEDLAND, COLIN, M.B., House Physician, Lewisham;

DRAKE, C. H., M.R.C.S. Eng., House Physician, St. Alfege's;

BLEADEN, F. A., M.R.C.S. Eng., House Physician, St. Andrew's;

BRANDER, W. G., B.Chir., House Physician, St. James';

MITCHELL-SMITH, J. I., M.R.C.S. Eng., House Surgeon, St. Giles';

MAY, QUEENIE I. E., M.B., Clinical Assistant, St. Charles';

LINDSAY, D. M., M.D., M.C.O.G., Part-time A.M.O., Maternity Department, St. Leonard's;

TROUTON, NORAH E., M.D., D.T.M., Temp. D.M.O., North Battersea;

GURRIE, N. S., M.D., Temp. D.M.O., Brixton and Denmark Hill;

AGASSIZ, C. D. S., M.D., M.R.C.P., D.P.H., Senior M.O., Central Office Staff;

FERRABY, G. S., M.B., F.R.C.S., B.S., Senior A.M.O. (I.), Dulwich;

HOLMES, S. W., M.B., F.R.C.S., Senior A.M.O. (II.), St. Stephen's;

DORLING, G. C., F.R.C.S., Senior A.M.O. (II.), St. Mary Abbots;

MASON, J. H. G., M.D., M.R.C.P., Senior A.M.O. (II.), St. Andrew's;

JONES, A. N., M.B., F.R.C.S., Senior A.M.O. (II.), St. Andrew's;

HODSON, H. B., M.D., M.R.C.P., Senior A.M.O. (II.), High Wood;

WHEATON, C. E. W., M.D., M.R.C.P., Senior A.M.O. (II.), St. Alfege's;

SEYMOUR, S. G., M.D., Senior A.M.O. (II.), St. Alfege's;

WHYTE, ELIZABETH C., M.B., A.M.O. (II.), North-Western;

PHILLIPS, JOHN, M.B., A.M.O. (II.), St. Charles';

FOX, R. W. S., M.B., A.M.O. (II.), St. Mary, Islington.

Westminster Hospital.—The following appointments are announced:—

MULLALLY, G. T., M.S. Lond., F.R.C.S. Eng., Surgeon;

CADE, STANFORD, F.R.C.S. Eng., Surgeon;

LEE, E. S., M.S. Lond., F.R.C.S. Eng., Assistant Surgeon; and

MACNAB, G. H., M.B. Edin., F.R.C.S. Eng., Assistant Surgeon.

Certifying Surgeon under the Factory and Workshop Acts: Dr. D. V. SUMMERS (Kettering District, Northants).

Births, Marriages, and Deaths

BIRTHS

CHRISTIE.—On Feb. 9th, the wife of Dr. W. J. Christie, Mordenroad, S.W., of a son.

CHURCHER.—On Feb. 12th, at Eastbourne, the wife of D. G. Churcher, M.D., F.R.C.S., of a son.

DARLEY.—On Feb. 12th, at Claygate, Surrey, the wife of Dr. Rupert D. Darley, of a daughter.

GOW.—On Feb. 11th, at Upper Harley-street, N.W., the wife of Dr. A. E. Gow, of a girl and a boy.

GRAHAM.—On Feb. 9th at Welbeck-street, the wife of Dr. J. M. Graham, of Seaford, of a son.

LYTHGOE.—On Feb. 13th, at Woburn-square, London, W.C., the wife of Dr. R. J. Lythgoe, of a daughter.

MARRIAGES

GARDE—WHELAN.—On Jan. 25th, in London, Godfrey W. Garde, M.B. Dubl., to Margaret B. Whelan.

GREEN—ROBERTS.—On Feb. 9th, at Wells, Somerset, Philip Green, M.B. Manch., of Portsmouth, to Violet Agnes Roberts, widow of Dr. Hamilton Roberts.

PRIEST—BURGESS.—On Feb. 6th, at Hendon, Wilfrid Michael Priest, M.D., M.R.C.P. Lond., to Marianne Burgess.

ROLT—NIMMO.—On Feb. 6th, in London, John B. Rolt, M.D. Edin., of Chalfont St. Giles, to Willa Mae Nimmo.

DEATHS

DOWNES.—On Feb. 9th, at Ilminster, Somerset, Harold Downes, M.B. Edin., aged 70.

GOVER.—On Feb. 11th, at Nevern-square, S.W., Col. John Maxwell Gover, D.S.O., M.D. Durh., aged 59.

JUST.—On Feb. 13th, in London, Theodore Hartman Just, M.B. Camb., F.R.C.S. Eng.

LAWRIE.—On Feb. 13th, at St. Leonards-on-Sea, David Lawrie, M.B. Glasg., D.P.H., aged 76.

POOLMAN.—On Feb. 10th, at Ridgmount-gardens, W.C., Arthur Edward Poolman, M.R.C.S. Eng.

ROBERTSON.—On Feb. 9th, Frederick William Robertson, O.B.E., M.D. Lond., of Bletchingley, Surrey, aged 70.

SIEGER.—At 11, Sandringham-terrace, Greenock, on Feb. 4th, Albert S., L.R.C.P. Edin., D.P.H. Glas., Asst. Port Medical Officer, Glasgow. Beloved husband of M. T. Meechan. R.I.P.

TAYLOR.—On Feb. 12th, at Weybridge, William Bramley Taylor, M.R.C.S. Eng., J.P., aged 90.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

INDEX TO "THE LANCET," VOL. II, 1936

THE Index and Title-page to Vol. II, 1936, which was completed with the issue of Dec. 26th, is now ready. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.